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GERMAN CULTURE

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THE CONTRIBUTION OF THE GERMANS TO KNOWLEDGE, LITERATURE, ART, AND LIFE

EDITED BY

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PREFACE

It has long been matter of common knowledge that the Germans are an intellectually-gifted, a highly-educated, and a most laborious people. It was also understood that they were an earnest-minded people. In recent times they have put their claim very much higher than this. They have become morbidly self-conscious, they habitually sit in judgment upon their national character and their achievements, and they declare themselves an intellectual and moral aristocracy whose civilisation represents the high-water mark of human attainment and progress. It would be easy to quote in illustration a series of isolated passages from philosophers and theologians, historians and poets. Even more significant is the strenuous attempt which has been made to indoctrinate the popular mind with the idea of the surpassing greatness of Germany. A good example of this patriotic propaganda is furnished in *Das deutsche Volksthum*, edited by Dr. Hans Meyer. This work, which has apparently enjoyed official favour and met a large public demand, states that its aim is "to create the conviction that nothing greater or fairer than German nationality has appeared in the whole history of humanity." As a fact, the band of well-known writers who co-operate with Dr. Meyer in paying this compliment to their country find the quoted thesis all too modest, and with one consent, and with wearisome reiteration, they enforce the lesson of the superlative character of German intelligence, virtue and valour.

Even in normal circumstances such a pose would pro-

voke some protest, and possibly some amusement. Under present conditions, when the diffusion of the German type of civilisation might be thought to be an end that sanctifies almost any iniquity as a means, it is not surprising that the German claim of pre-eminence should have called forth a storm of indignation and derision. So strong is the resentment of the moment that the hollowness of Teutonic pretensions has become a popular topic in the newspapers and magazines, and the authority of honoured names has been lent in support of the view that, in the fields of science, art and literature, Germany is quite a second-rate figure, and perhaps not much better than a plagiarist and an impostor. Intelligibly human, however, as this attitude is, it is as little fair and sane as the estimate put upon Germany by herself in her worst accesses of megalomania. The Germans are undoubtedly one of the great peoples of history, who, like the English, combine a share of the intellectual and æsthetic endowments of the ancient Greeks with the practical capacity of the ancient Romans; and they have made a substantial contribution to the common store of civilised humanity. They have made some mark—often a very deep mark—in every higher department of the life and labour of the human spirit. The aim of the present book is to give a somewhat detailed account of what Germany has thus accomplished in the chief spheres of human activity, and an effort has been made to estimate the value of its work without prepossession or prejudice.

"German Culture" is a title which is suitable because of its vogue, but it requires some definition. The German term to which "Culture" has hitherto been treated as an equivalent is *Bildung*. This was the usage of Matthew Arnold, who meant by culture an individual intellectual possession—the quality, and also the contents, of a mind which has been refined, disciplined, and stored with the

best that has been thought and uttered. *Kultur* is ordinarily used by the Germans where we should speak of civilisation. *Kulturgeschichte*, the History of *Kultur*, is the equivalent of our "History of Civilisation." The shade of difference is sometimes said to be that while in speaking of civilisation, we give prominence to its material aspect, and think specially of the extension of man's power over nature through his discoveries and inventions, the Germans shift the emphasis to the intellectual and moral side, and think of *Kultur* as "the organisation of a people's life in which the ideals of religion, morality, and science come to realisation." The German vocabulary contains both terms, and when a distinction is drawn, it is usually in some such way as has been indicated. The Kaiser is reported to have recently said that *Zivilisation* is a mere affair of the drawing-room, thus identifying it with civility or politeness, and that *Kultur* means "to have the deepest conscientiousness and the highest morality." "My Germans," he added, "possess that." The implied reflection on German manners may or may not be deserved, but, in any case, the Kaiser might have done better for outside information than found on a purely colloquial mode of speech as conveying the German idea of civilisation. Nor is the moment at all well chosen for claiming that the Germans are the representatives of a higher morality than any other nation. We have no reason, though constitutionally rather averse from such comparisons, for shrinking from the test of our own *Kultur* by the moral criterion. A large part of our case before the tribunal of history just is, that our civilisation stands for order, liberty, peace, justice, and humanity to an extent that a German world-empire would not be likely to do. But it is only a question here as to the meaning of a word, and the upshot is that *Kultur* is Civilisation viewed on its higher side. By German Culture we shall understand the contribution which the Germans

have made to the ideal tasks and achievements of the civilised world.

The contributors to this book have not had the opportunity of discussing a general plan and attitude, or of comparing estimates and conclusions. Their common qualification is that it has been their business, in the vocation of University teachers, to acquire a knowledge of the subjects dealt with, and to form a judgment upon the range and value of the German labours in their several provinces. The common spirit may perhaps be described as one of critical appreciation. Each writer is exclusively responsible for his own work and opinions.

W. P. P.

EDINBURGH,
5th February, 1915.

CONTENTS

PAGE

I. GERMANY AND PRUSSIA 1

By RICHARD LODGE, LL.D., LITT.D., Professor of History in the University of Edinburgh and Honorary Fellow of Brasenose College, Oxford

II. GERMAN PHILOSOPHY 35

By A. D. LINDSAY, M.A., Fellow and Tutor, Balliol College, Oxford

III. WHAT SCIENCE OWES TO GERMAN INVESTIGATORS . 65

By PROF. J. ARTHUR THOMSON, M.A., LL.D., Professor of Natural History in the University of Aberdeen

IV. GERMAN LITERATURE 161

By JOHN LEES, M.A., D.Litt., Lecturer on German in the University of Aberdeen

V. GERMAN ART 197

By G. BALDWIN BROWN, M.A., Professor of Fine Arts in the University of Edinburgh

VI. GERMAN MUSIC 231

By D. F. TOVEY, B.A. Oxon., Reid Professor of Music in the University of Edinburgh

VII. THE STRENGTH AND WEAKNESS OF GERMAN EDUCATION 301

By MICHAEL E. SADLER, C.B., LL.D., Vice-Chancellor of the University of Leeds

PAGE

VIII. POLITICAL AND ECONOMIC ASPECTS OF GERMAN NATIONALISM 315

By D. H. MACGREGOR, M.A., Professor of Political Economy in the University of Leeds

IX. GERMAN RELIGION AND THEOLOGY 345

By REV. W. P. PATERSON, D.D., Professor of Divinity in the University of Edinburgh

GERMAN CULTURE

I

GERMANY AND PRUSSIA

A HISTORICAL SKETCH

By RICHARD LODGE, LL.D., Litt.D.

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We Britons are a very insular people. We know very little of foreign languages, and we know still less of foreign history. One result of the present horrible war is that it has created a sudden desire to learn something about the state-system of Europe in which we have become so suddenly absorbed, something about the complicated international relations and rivalries which have generated this earth-shaking convulsion, and above all something about this neighbouring state of Germany with which we and our allies have come to such deadly grips. It is the object of the following pages to give as clear an account as is consistent with brevity of the complex historical processes which have given rise to modern Germany, to its colossal strength, and to its even more colossal ambitions.

The first need for every student of history is to form a clear conception of the proper names which he has to use. The ordinary reader, who gets his historical ideas mainly from newspapers and from conversation, is apt to employ proper names in a very loose manner and without any deliberate thought. The two proper names which are most prominent in the present chapter are Germany and Prussia.

By many British readers these terms are used as if they meant much the same thing, and half the obscurity of ordinary ideas about German history arises from this careless identification. Yet, as every German knows, they are not identical terms even in the present day, and before 1871 their meaning is so entirely different that their confusion leads to the wildest misconceptions. We may take Germany, the wider and more comprehensive term, first. The explanation of Prussia, a term which has a quite peculiar history, will follow later.

The first appearance in history of German or Teutonic peoples takes us back to the days when the dominant power in the countries round the Mediterranean basin was in the hands of Rome. At that time these Germans were nomad tribes, and there was no country which could be called Germany. The conquest of Gaul by Julius Cæsar first brought Rome into contact with German tribes, and in the following generations prolonged wars ensued until something like a fixed border was acquired by Rome on the northern frontiers of the empire in the West. But, as the power of Rome declined, this frontier was obliterated, and the German tribes were forced southwards and westwards, partly by the growth of population and partly by the pressure of other migratory peoples behind them. In successive waves Goths, Vandals, Burgundians, Suevians, Franks, Saxons, Angles, and a host of other tribes, poured into the lands which still owned the sway of Rome. In spite of the efforts of Rome to tame and employ in her service the earlier settlers, the successive hordes proved too much for her diminishing strength, and the western empire of Rome was gradually broken to pieces. The traditions of Roman rule were only preserved amid the resultant chaos, partly by the admiration which the great edifice had excited in the men who overthrew it, partly by the survival of the eastern capital, Byzantium or Constantinople, whose geographical position and strength rendered it unassailable, and finally by the struggle of the Bishops

of Rome to maintain the ecclesiastical unity which had been associated with the Roman Empire ever since the acceptance of Christianity by Constantine and his successors.

By the sixth century all the western provinces of Rome, including Italy, Gaul, Spain, and great part of Britain, had been occupied by Teutonic conquerors, and the Vandals had actually crossed over into Africa. The victors now began to make wars upon each other, and gradually the successes of the Franks, the most capable of the tribes from a military and a political point of view, evolved something like order and unity out of the chaos which followed the fall of Roman rule. Combining the virile energies of the younger races with the surviving traditions of Roman government, the great Frankish rulers known as the Karolings, who had risen on the decline of the earlier Merovingians, built up a superficially united and organised state in central Europe. The victory of Charles Martel over the Saracens, who had overthrown the Visigothic kingdom in Spain, made the Karolings the acknowledged champions and leaders of the Christianised Germans; and their ascendancy was completed when Charles the Great conquered and converted the still heathen Saxons. Finally a political alliance with the Popes of Rome to defend common interests in Italy led to one of the epoch-making events in the growth of Europe, the coronation of Charles the Great as Roman Emperor in A.D. 800. From his capital at Aachen Charles ruled over the greater part of modern Germany, over the whole of modern France, and over parts of Spain and Italy, while his imperial title gave him those pretentions to world-wide rule which obstinate tradition still associated with the name of Rome.

But this newly-formed unity of western Christendom had little substantial foundation and could not be durable. Charles the Great's successors lacked his ability and his strength of character, and the fatal practice of subdivision among sons, to which the Germans were long attached, proved fatal to the attempted revival of the Roman Empire

in Frankish hands. In the next generation we find the beginning of a splitting up of Charles' dominions in which the main divisions of later European states can be dimly discerned. Western Francia, in which the Franks had never been more than a dominant minority, became before long completely separated from Eastern Francia, in which Teutonic blood was much less diluted. Henceforth we have two considerable states, of which the more westerly kept the name of Francia and grew into modern France, while the eastern state lost its association with the Frankish name and came to be known as Alamannia, as Deutschland to its own people, and to us as Germany. Between these two fairly-defined units lay a long strip of border territory, stretching from the mouth of the Rhine to Italy, which broke up into a bewildering number of separate provinces, Lorraine, the Burgundies, &c., and these became a subject of greedy rivalry between the larger units on either side of them.

But Germany and France, as by anticipation we may call these larger units, were at the time by no means coherent states. Feudalism, which had arisen from a combination of German and Roman usages, proved in both a formidable disruptive force. The dukes and counts, who had been the administrative agents of the great Karolingian rulers, became practically independent within their administrative areas under the degenerate successors of Charles the Great. For a time anarchy seemed likely to be the fate of Europe as it had been on the fall of Rome, and new Teutonic hordes from Scandinavia took advantage of the absence of any strong central rule to ravage the shores of their southern and western neighbours.

Of the two states which were thus equally threatened with complete disruption, Germany was the first to recover something like real political cohesion. Under two able Saxon rulers, Henry the Fowler and Otto the Great, the central authority recovered some of its lost control over the powerful vassals, and the latter was in 962 crowned Emperor by the Pope. Thus a German prince once more

succeeded in regaining those imperial pretensions which a century and a half before had been associated with the more extensive rule of Charles the Great. By this union of the German kingship with the shadowy claims of Rome to rule the world was constituted that extraordinary institution, the Holy Roman Empire, which lasted in name till 1806, although long before that date, in the oft-quoted phrase, it had ceased to be either Holy, or Roman, or an Empire.

The history of the Holy Roman Empire, which is still one of the most cherished traditions of Germany, may be studied in the famous essay by Lord Bryce, which should be placed in the hands of every young student of history. For our purpose it is enough to state that the combination of imperial claims with the monarchy in Germany proved ruinous to both. On the one hand, the rulers of the growing national states of Europe refused to submit to the claims to imperial suzerainty which were advanced by a German king. On the other hand, the imperial pretensions involved successive German kings in disastrous quarrels with the Papacy, which claimed to represent Roman domination on its spiritual side, and in still more disastrous expeditions to Italy, which led to the neglect and sacrifice of German interests and to the weakening of the central power in Germany. Further, while countries like France and England, and later Spain, were acquiring strength and cohesion under hereditary monarchies, Germany became steadily weaker and more divided under elected rulers. This practice of election, associated by old tradition with the imperial office, enabled the German princes, ecclesiastical and secular, to gain dangerous independence in their own territories, either by choosing a succession of feeble princes to exercise purely nominal rule, or by exacting conditions from the successful candidates which should impede the efficient exercise of the powers of the Crown.

There were two possible ways in which German unity, which had almost disappeared at the time of the Great

Interregnum which followed the fall of the Hohenstaufen dynasty in the thirteenth century, might have been restored. One was to create an efficient federal machinery in place of the obsolete and discredited monarchical institutions. The other was that a successful dynasty might secure such territorial predominance as to make the practice of election a mere form and to obtain practically hereditary possession of the imperial crown. The latter policy was the more obvious, and it was more than once attempted with a certain approach to success. It was first formulated by Charles IV (1346–1378), a member of the great House of Luxemburg, which furnished four almost successive emperors in the fourteenth century. Although his name is usually associated with the issue of the Golden Bull, which is said to have "legalised anarchy and called it a constitution," Charles IV's real achievement was the concentration of vast territories in the hands of his family. His aims, though frustrated by the folly of one son and the unstable ambitions of another, were resumed by the more famous house of Hapsburg, which, through a combination of good fortune and tenacity, succeeded in gaining possession of the imperial crown, with one short break, from 1438 to 1806.

But the Austrian Hapsburgs, though they acquired vast territories, and though they rendered one inestimable service to Germany by repelling the attacks of the Turks, prejudiced their position in Germany by extending their power over non-German provinces, such as Bohemia and Hungary, and later considerable lands in Italy. That this bundle of heterogeneous states should have been held together at a time when nationality was becoming more and more the recognised foundation upon which political unity was based, is one of the most difficult enigmas which confront the student of history. But, however creditable the achievement may appear, this expansion eastwards and southwards made it impossible for Austria to bring Germany under its direct rule, or to revive an efficient German monarchy. On the contrary, the most obvious result of

Hapsburg rule in Germany was that, while the dynasty was gaining power in the east, German interests were steadily being sacrificed in the west. The long-disputed provinces on the border, the Burgundies, Provence, Alsace, and ultimately Lorraine, fell into the hands of France. Nor was this all. Districts which had once been integral parts of Germany, such as the Netherlands and some of the cantons of Switzerland, became detached from that kingdom, and Switzerland and the northern provinces of the Netherlands became independent states with interests and traditions of their own.

The other expedient, federal reform, was only tried in the course of the fifteenth century, before the house of Hapsburg had risen to its later grandeur. Under Frederick III and Maximilian I successive efforts were made to establish a Federal Council for the administration of Germany, to create a federal court of justice for the settlement of disputes in order to put a stop to private wars, and to introduce an equalised system of federal taxation. Whether these attempts to substitute oligarchical for personal rule had any chance of success is more than doubtful. They would probably have been foiled by the resolute resistance of the Hapsburgs, who under Charles V secured, by the accidents of dynastic succession, a territorial predominance in Europe which had had no parallel since the days of Charles the Great. But, apart from this resistance, all possibility that these experiments might succeed was destroyed by the Reformation. The rise of Protestantism, in which Germany played so prominent a part, completed the political disruption of Germany which the Holy Roman Empire had already brought about. Charles V, in spite of the vast extent of his dominions, and perhaps on account of that very extent, which rendered any real union impossible, was impotent to enforce his sovereignty in a Germany which was now distracted by religious as well as by political discord. His abdication was a virtual acknowledgment of failure.

From the sixteenth century Germany became avowedly, what it had long been practically, a mere geographical expression. The independence of the greater princes was recognised in the Treaty of Westphalia (1648), which closed the religious wars in Germany to which the Reformation had given rise. It is true that in the seventeenth and eighteenth centuries some of the outward symbols of unity remained. There was still a nominal emperor-king, there was a Reichstag or Diet, and there were two imperial courts of law. But these institutions had lost all efficient control over the political action of German states. There were also the ties of a common language and some not inglorious traditions associated with the memory of German heroes such as Charles the Great, the Ottos, and Frederick Barbarossa. For all practical purposes, however, German nationality was a thing of the past, and in the eighteenth century German rulers made war on each other with as little scruple or hesitation as they made war against other states.

We must now turn to that other proper name which was alluded to at the outset. And the first thing to grasp clearly is that Prussia is a rather inadequate and even misleading designation for the state to which it has come to be applied. The real nucleus and kernel of the Prussian state is not Prussia, which gives his familiar title to the king, but Brandenburg. Berlin belongs to Brandenburg, and not to Prussia, and it would be an aid to accurate historical thinking if usage would allow us to call the state of which Berlin is the capital Brandenburg instead of Prussia. But, as we are condemned to use the current term, we may at least understand what it means and how it came to be applied.

Brandenburg was a German province formed in the Middle Ages by the union of several marks or border districts which had been gradually acquired by German princes as they forced back the heathen Slavs from their hold upon the lands lying to the south of the Baltic. The ruler over these districts was called the Mark-graf or Count of

the Mark. In the fourteenth century this Margrave of Brandenburg was sufficiently powerful and prominent to be included among the seven electors who chose the successive kings and emperors. In 1356 the Golden Bull of Charles IV gave to Brandenburg, as to the other secular electorates, the inestimable boon of indivisibility and hereditary succession. In 1415 the electorate, after passing through several hands, was granted by the emperor Sigismund to the then head of the house of Hohenzollern. Under the guidance of this famous dynasty, which can boast that it has produced fewer weaklings than any other ruling family in history, Brandenburg was destined to achieve its later greatness.

The territorial expansion of Brandenburg was almost continuous in the seventeenth, eighteenth, and nineteenth centuries, and the main stages in this expansion must be clearly grasped. In the early part of the seventeenth century two important inheritances fell to the head of the Hohenzollerns. In the extreme west of Germany the Elector of Brandenburg acquired the duchy of Cleves, a distant but important possession on the Rhine just on the important border-line between Germany and the United Provinces. A few years later the extinction of a junior branch of the house brought in another distant province in the extreme east, the duchy of East Prussia. This was a fragment of the large Prussian state which had in the thirteenth century been wrested from the Slavs by the Knights of the Teutonic Order. The last of the Grand Masters of the Order, Albert of Hohenzollern, had become a Protestant and had made East Prussia into a secular duchy for himself and his heirs. But he held it, as the Knights had held it in their later and degenerate days, in vassalage to the crown of Poland. And Poland had seized the large area of West Prussia which cut off the duchy from the borders of Brandenburg. The duchy was still a fief of Poland when, on the failure of Albert's line, it escheated to the Elector of Brandenburg.

In 1640, while Germany was still in the throes of the Thirty Years' War, Frederick William, fondly known as the Great Elector, succeeded to Brandenburg and to the two outlying provinces which had been so recently acquired. He ranks as the first of the eminent builders of Prussian greatness. During the war the duchy of Pomerania had fallen vacant. The Hohenzollerns had legal claims to the succession, but the duchy was in the occupation of the Swedes. In spite of the persistence with which the Great Elector pressed his claim, he was compelled in the peace of Westphalia to acquiesce in the retention by Sweden of the larger and more valuable part of Pomerania, including the important towns on the coast, and to content himself with a fragment of the duchy. But he received no small compensation in the cession of the secularised bishoprics of Magdeburg, Halberstadt, Camin, and Minden, which at once strengthened the central block of his dominions and also brought them nearer to his still isolated duchy of Cleves. In his later years the Great Elector played an active but by no means disinterested part in the general politics of Europe, and thus gained for Brandenburg a prominence and distinction beyond the limits of Germany which it had never possessed before. He also freed East Prussia from the suzerainty of Poland, and, but for the intervention of Louis XIV, he would have retained the Swedish share of Pomerania, which he had actually wrested from that power. At the time of his death, Brandenburg might fairly be regarded as being, after Austria, the most powerful state in Germany, and as having risen almost to the rank of at any rate a secondary state in Europe.

The Great Elector's son and successor, Frederick I, is the first King of Prussia. He owed this rise in rank, not to his own abilities, which were below the Hohenzollern standard, but partly to the reputation gained by his father, and partly to the value which the Emperor Leopold attached to the gaining of the support of Brandenburg in the war of the Spanish Succession. As he was still Elector and Mar-

grave of Brandenburg, he associated his royal designation with his distant and as yet little valued duchy of Prussia, just as the later kings of Italy took their earlier royal title from Sardinia, and not from Piedmont or Savoy. The second king, Frederick William I, is notorious as the impassioned collector of abnormally tall soldiers, but he deserves more honourable renown as the careful and economic ruler who gave to his rather scattered dominions the unifying force of a highly-organised and efficient administration, and also bequeathed to his son a full treasury and a well-equipped and disciplined army. It was during his reign that Prussia acquired Stettin, and thus gained its first important port on the Baltic.

Frederick the Great, who set himself to make use of the forces which his father had been content to inspect and accumulate, deserves more detailed consideration than his predecessors, partly because he raised Prussia to be one of the great states of Europe, and partly because the impress which he put upon the state has never been effaced. His combination of eminent efficiency in warfare and diplomacy with a complete and cynical disregard of all conventions of political morality has bequeathed to later Prussian rulers the tradition that success justifies everything, and that moral scruples, if they impede success, are proofs of contemptible weakness. At the same time the value of his services to Prussia, from his own point of view, is incontestable. By resolute action and astute diplomacy he seized and held Silesia, which has become the great industrial province of modern Prussia. By his heroic resistance against overwhelming odds in the Seven Years' War he not only gained imperishable renown for himself, but he raised Prussia to rank as an equal with Austria and as immeasurably superior to any other state of Germany. By his successful intervention in the Polish question he gained the province of West Prussia, and thus linked up with Brandenburg the hitherto outlying and indefensible province of East Prussia, from which he took his title. And,

finally, by his resistance to the selfishly aggressive policy of the Emperor Joseph II he identified Prussia with the championship of German interests and independence, and thus took a very important step in the direction of substituting Prussian for Austrian ascendancy in Germany.

From the death of Frederick the Great the history of Germany and the history of Prussia are closely commingled together, because it was already apparent that all hope of reconstructing German unity lay in the establishment of Prussian headship. Frederick William II, who succeeded his uncle, possessed little ability or strength of character, but his ministers had been trained under the great king. When Prussia in 1787 foiled France, Austria's ally, in the Netherlands, and when in 1788 Frederick William formed a triple alliance with England and Holland to checkmate Austria and Russia in the east of Europe, it appeared that the impulse which Frederick had given might carry Prussia far on the way towards its destined goal. But at this juncture the outbreak of the French Revolution completely altered the course both of European and of German history. One of its strangest and most unexpected results was to bring about an alliance of Austria and Prussia, the two states whose previous relations seemed to guarantee irreconcilable hostility between them. The alliance, however, proved of necessity to be hollow and insincere, and the ill-feeling aroused by the final partitions of Poland was fatal to the maintenance of the original coalition against the French republic. As soon as the success of France became assured, Prussia deserted her ally and adopted for the next ten years an ignominious but not unprofitable policy of neutrality.

In the second coalition against France Prussia stood obstinately aloof, and the victories of Bonaparte and the establishment of the French Empire failed to induce her to strike a blow for the threatened interests and honour of Germany. When at last the intolerable insults of Napoleon

drove Prussia to take up arms, she had to pay a heavy penalty for the sluggish stagnation which contrasted so strongly with the brisk resolution of Frederick the Great. The first opportunity of striking a blow was lost by a preposterous delay which allowed Austria to be crushed at Austerlitz. And the tardy rupture with the imperious conqueror was followed by the crushing blows of Auerstadt and Jena. The treaty of Tilsit marks the nadir of the humbled state. Deprived of many of her recent acquisitions and with her fortresses occupied by foreign garrisons, Prussia was reduced to abject impotence.

But the very magnitude and shock of the disaster brought salvation to the shattered state. Great men, like Stein and Hardenberg, introduced much-needed social reforms, including the abolition of serfdom. Scharnhorst and Gneisenau undertook the reconstruction of the army on the basis of compulsory service. Even the stubbornly conservative nobles and gentry of Brandenburg, the Junker party of modern Prussia, submitted to changes which in ordinary times they would have doggedly resisted. And the spirit of resistance which was kindled in Prussia spread with startling rapidity through other provinces of Germany which suffered from the foreign yoke. Poets and professors combined to teach to Germans the supreme duty of restoring freedom to their common fatherland. With the desire of liberty came a passionate demand for national unity, the lack of which was rightly regarded as the cause of all their misfortunes. The opportunity for fulfilling some of their hopes came when Napoleon and the scanty remnant of the grand army returned from their fatal march to Moscow. The "war of liberation" which followed is one of the glorious episodes in the history of Germany; and the leader in the war was Prussia. Austria, though she had fought more stubbornly against France in the past than Prussia had done, played a far less heroic part in the final struggle. On the contrary, guided by the calculating craft of Metternich, Austria held aloof till the last moment

in order that she might dictate her own terms as the price for throwing her sword into the balance.

The Germany which emerged from the Napoleonic wars was in many ways very different from the Germany of the eighteenth century. The Holy Roman Empire had perished, and with it had gone the obsolete and useless machinery which had been for so long associated with it. The number of separate states had been enormously diminished. Of the old ecclesiastical principalities, free cities, and knights, hardly any remained. Their lands had been "mediatised," or in other words, annexed by their more powerful neighbours. In themselves these changes, though they diminished disunion, did not tend directly towards union. The great princes, stronger than ever owing to their annexations, were not likely to sacrifice their independence to bring about unity, now that the pressing danger of French aggression was removed. But the greatest change was the stirring of a new spirit of liberty and nationality in the breasts of the hitherto divided and submissive peoples of Germany, and the growth of a national literature to voice these aspirations. It remained to be seen whether the impulse which Germany had received from the war of liberation would be strong enough to constitute a new and vigorous Germany out of the surviving fragments of the shattered empire. The one state which could guide and profit by such a measure of reconstruction was Prussia, and there were a few men sanguine enough to hope that she would seize the golden opportunity.

It was soon apparent that the aspirations of the people were not to be realised at present, and that Prussia was neither enlightened nor unselfish enough to head a popular movement towards German unity. The princes had encouraged the rising of the peoples against Napoleon so long as their own interests were identical with those of their subjects, but they were at heart as jealous of their own privileges as of their own independence. They found an

able and astute leader in Metternich, who succeeded in dominating and largely in dictating the settlement effected by the Congress of Vienna. Representing a state whose very existence was a negation of the doctrine of nationality, Metternich could not possibly yield to the popular demand for a national union of Germany. In such a union Austria could find no place except by the impossible sacrifice of her non-German dominions. Under his guidance Germany was reconstituted as a loose confederation of princes rather than of peoples, and Austria retained a preponderance which she had done little to deserve. A revival of the Holy Roman Empire, which some ardent nationalists suggested, would have been preferable to the *Bund* of 1815.

To the disappointment and chagrin of enthusiastic patriots, Prussia not only acquiesced in this settlement, but co-operated with Austria in effecting and maintaining it. This apparent subservience, however, was not unprofitable. The year 1815 was a year of disappointment to Germany, but it is a distinguished year in the annals of Prussia. It is true that Frederick William III had by his agreement with the Czar to give up those Polish districts which had been detached from Prussia in 1807 to form the Grand Duchy of Warsaw. But the compensation for this loss was ample, and from the point of view of future influence in Germany more than ample. Not only was a huge slice of Saxony annexed to Prussia, but the ecclesiastical principalities along the Rhine Valley, from Coblenz down to the frontier of Holland, were also given to that state. As Austria at the same time resolutely refused to take back the southern Netherlands, the defence of the most vulnerable frontier of Germany against any future aggression on the part of France was henceforth entrusted to Prussia. This "Wacht am Rhein" associated Prussia more closely than ever with the championship of Germany, and the nationalists who bewailed the inadequate results of the war of liberation could console themselves with the thought that their triumph was only deferred.

Little more than thirty years after 1815 the longed-for opportunity to reunite Germany under Prussian leadership seemed once more to present itself. In the interval between 1815 and 1848 the twin offspring of the French Revolution, liberalism and nationality, which Metternich had sought to strangle, had made very significant advances. And to contemporary observers it seemed as if the two forces were indissolubly united. The achievement of independence by Servia and Greece, the overthrow of the Bourbons by the July Revolution, the success of Belgium in severing the ties which had bound it to Holland, were all events which stimulated the more ardent spirits in Germany to believe that the future was on their side. It is true that a Polish rising had been suppressed, but, on the other hand, both in Spain and in Portugal constitutional principles had gained ground by the defeat of Don Miguel and Don Carlos, and the triumph of the Whigs in Britain when the Reform Act was passed in 1832 seemed to put a final end to the time when British influence had been on the side of authority against liberty. But the more Metternich's system lost ground in Europe, the more resolutely did he resist any attempt to reform the constitution of Germany. And, on the whole, he was successful. In a few separate states, such as Baden, constitutions based upon liberal principles were conceded, but in Germany generally the interests of the princes led them to support Austria, and the *Bund*, in spite of its glaring defects and anomalies, remained unreformed and almost unshaken until 1848.

The one serious danger during this period was that Prussia might be induced to espouse the cause of the reformers. From this danger Metternich escaped by securing the interested complicity of Frederick William III and Frederick William IV. Both these kings—the one from old prejudices imbibed at the time of the French Revolution, and the other from attachment to the doctrine of divine right—continued to maintain the cause of reaction in

Europe. When France and England after 1830 were drawn together by their joint championship of Belgium and of liberal and national principles, Austria, Russia, and Prussia formed a powerful counter-league to resist principles which were still denounced as savouring of Jacobinism and as leading to revolution. And yet the liberal party in Germany continued to look to Prussia for countenance and aid, though they received nothing but rebuffs in return. They did so because without Prussian support they had no hope either of success or of security against Austrian measures of repression. Metternich could chuckle in security over what seemed to him the folly of his adversaries. But, looking back, we can see that the folly was not wholly on one side. Metternich and his opponents both made a fundamental misconception. Neither perceived that liberalism and nationality, in spite of their close historical association, were really quite distinct forces, and that the latter could triumph without the aid of the former. Prussian kings and Prussian nobles and gentry were almost instinctively anti-liberal, but they were not therefore anti-national. The interests of Austria and Prussia, in spite of their apparent alliance, were really diametrically opposed, and at the very time that Prussia was giving the cold shoulder to liberal aspirations in Germany, she was taking steps which facilitated her subsequent acquisition of the German headship. These measures were economic rather than political. The still scattered character of her dominions made Prussia impatient of the hindrances to trade caused by geographical boundaries. In order to secure the free passage of goods from one province of Prussia to another, it was necessary to secure their free passage through the intervening territories. Hence the series of treaties with the other German states which ripened into the famous *Zollverein*, or customs union. Hence side by side with the loose political confederation or *Bund* there grew up a far closer and more efficient economic federation in Germany, and not only was Prussia the head of the one as Austria

was the head of the other, but from the *Zollverein* Austria was jealously excluded.

In 1848 the long looked-for opportunity of the national liberal party seemed at last to have arrived. The whole of the edifice which Metternich had laboriously constructed and maintained was swept away by a spate of revolutions. The veteran statesman himself was forced to fly to England by a mob rising in Vienna. Frederick William IV gave way to the rioters at Berlin and conceded a constitution which he had refused to grant the year before. The lesser rulers found it impossible to withhold similar concessions. The triumphant liberals now set to work to frame a new constitution for a united Germany. With the consent of the Diet, a national parliament chosen by popular vote, and not a mere collection of the nominees of princes and governments, met at Frankfort in May, 1848. After a prolonged contest between the Great German party, which desired the continued inclusion of Austria, and the Little German party, which aimed at its exclusion, the latter prevailed, and the Empire of a reconstituted Germany was formally offered to the Prussian King in 1849. The answer was an unhesitating refusal, and in the general reaction which followed the first triumphs of the revolutionary movement, the Parliament of Frankfort was dissolved. But Frederick William, though he had rejected the offer of a crown from a revolutionary assembly, was not without hopes of profiting by the overthrow of the constitution of 1815. These hopes, however, were also doomed to disappointment. Austria, which had crushed the Italian rising by its own strength, and had defeated the Hungarian rebels with the aid of Russia and the Slavs, was determined to complete its triumph by the recovery of its old ascendancy in Germany. Prussia was forced to submit, and in 1850, at the humiliating conference at Olmütz, acquiesced in the restoration of the *Bund*. German unity seemed to be as far off as ever.

The events of these momentous years were watched

with the keenest interest by a young man who was destined to play a part in the subsequent shaping of German union, Otto von Bismarck. Born in 1815 of a typical Junker family in Brandenburg, he combined the prejudices and tenacity of his class with a keenness of perception rarely granted to men of iron will. He had growled his disapproval when the King, more pliant than most of the Hohenzollerns, had granted a Prussian constitution and had shown a willingness to coquet with the national liberals at Frankfort. All the greater was his exultation in 1849 when Frederick William, in his own words, refused to "pick a crown out of the mud." Even the convention of Olmütz, humiliating as it was to Prussia, pleased him, because it removed the taint of an alliance with the liberal party in Germany. From this time his own line of action was clearly marked out. Germany was to be united, not by the absorption of Prussia into Germany, but by the absorption of Germany into Prussia. And this object, the very antithesis of the ideal cherished by the German liberals, must be achieved by methods wholly opposed to those of liberalism. Germany must be created, in the words of his famous utterance, "not by speeches and votes, but by blood and iron." Twelve years, however, were to elapse before he had the power to carry his principles into practice.

Although the refusal of the imperial crown in 1849 is an event of cardinal importance, and although it gave a sinister twist to the subsequent development of Germany and to the relations between Germany and Great Britain, it must not be concluded that there was no justification for that act. It is quite possible to contend that Frederick William had no alternative but refusal, that the Frankfort Parliament had not shown such wisdom as to justify acceptance of the constitution which it had framed, that most of the German princes would have condemned such acceptance, and that it would have involved a war with Austria for which Prussia was not yet prepared. Nor were the full consequences of the refusal made clear for some

time to come. The preponderance which Austria had recovered in 1850 was weakened by the Crimean War and by the death of the Czar, Nicolas I. When in 1857 the insanity of Frederick William IV gave the regency to his brother William, there were, for a time, renewed hopes that Prussia might make at any rate a partial alliance with the reviving forces of liberalism. It is true that the Prince had been regarded as the opponent of reform in 1848, and had been driven from Berlin to England by the enmity of the revolutionary leaders. On the other hand, he was a soldier rather than a politician, and his first act was to choose a ministry acceptable to the liberal majority in the Prussian parliament. In the following year the marriage of his son to the Princess Royal of England was eagerly welcomed as bringing about an alliance with the country which was regarded as the example and the champion of constitutional government. The confident hopes thus engendered were further stimulated by the alliance of France with Piedmont and by the defeats of Austria at Magenta and Solferino. The most enlightened princes of Germany, with the Grand Duke of Baden at their head, thought the time had come for transforming the loose confederation of 1815 (*Staatenbund*) into a more centralised and coherent federation (*Bundesstaat*). With Austria weakened and discredited, nothing but the support of Prussia was needed to bring about a substantial measure of German unity. But this Prussian support was not forthcoming.

In 1861 William I succeeded to the Prussian throne on the death of his brother, and in the following year he became involved in a quarrel with his parliament over a scheme of army reform devised by Roon. The Parliament refused to grant the necessary supplies, and the liberal ministers advised the abandonment of the proposal. But to William I the army was peculiarly under the care of the Crown, and all his instinctive antagonism to constitutional government was revived. Dismissing his pusillanimous ministers, he appealed to Bismarck, who had made

himself notorious when he represented Prussia in the Diet by his calm assumption of equality with the Austrian representative, and who was avowedly hostile to anything like parliamentary control. With the King's support, and in spite of the disapproval of the Crown Prince and Princess, he carried on the government in defiance of the hostile majority. When the Parliament refused to vote supplies, he levied those which had been voted the year before, and contended that this was not a breach of the constitution. Thus he broke away from the liberal principles which for the last five years seemed to have gathered strength in Prussia. But he remained a nationalist, in the sense that he desired the unity of Germany. That unity was to be made by Prussia on its own terms, and this could only be accomplished by "blood and iron," or, in other words, by successful war. And in less than ten years he had succeeded in achieving what half a century of peace and constitutional effort had failed to bring about.

The three successive wars by means of which Bismarck succeeded, not only in uniting Germany and excluding Austria from the union, but also in aggrandising Prussia so unduly as to make the rest of Germany little more than a dependency of Prussia, constitute the most familiar chapter in modern German history, and there is no need to describe them in detail. The most striking characteristic of his policy is the deliberate and cold-blooded manner in which he sacrificed human life and all regard for political morality to gain his ends. Frederick the Great was his avowed model, but the pupil was at least the equal of his master. He began by picking a quarrel with Denmark over the vexed question of the duchies of Schleswig and Holstein. The purely legal aspects of this complicated question interested him as little as the legality of his claims in Silesia interested Frederick the Great. He had in this matter German sentiment on his side, and he induced Austria to become his accomplice. The military difficulties were insignificant. Russian acquiescence had been secured before-

hand when Prussia lent a hand to suppress a Polish rising in 1863. The other states did not venture to translate their sympathies with Denmark into action. The duchies were occupied and by the convention of Gastein in 1865 Prussia undertook the administration of Schleswig and handed over the government of Holstein to Austria.

This arrangement was avowedly provisional, as Bismarck had no intention of consenting to a permanent partition of the spoil. To secure the duchies and to put a final end to Austrian ascendancy or even rivalry in Germany, another war was necessary. To bring this about was a more difficult task. The King was against him, and so was public opinion in Prussia. The lesser states of Germany were almost certain in such a quarrel to side with Austria. But the greater the obstacles, the more obstinate was the determination of the minister to overcome them. He had supreme confidence in the efficiency of the Prussian army as reorganised by Roon and Moltke. He staked his whole future career upon this Austrian war, and he gained thereby the greatest of his personal triumphs. By persistent and ruthless diplomacy he left Austria no alternative but complete humiliation or war. The war of 1866 was one of the most rapid and decisive contests ever fought between two great powers. Within seven weeks not only were the recalcitrant German states reduced to submission, but the Austrian army was routed on the fatal field of Sadowa. And the settlement which followed the war was perhaps an even greater triumph for Bismarck than the actual struggle itself. Schleswig and Holstein were of necessity the prize of the victor, who was thus enabled in later years to construct the Kiel Canal. In addition, Prussia annexed Hanover, Hesse-Cassel, Nassau, and the free city of Frankfort-on-Main. This immensely aggrandised Prussia became the head of a North German Federation which included all German states north of the Main. In this new federation, a far more highly-organised unit than the *Bund*, which was now dissolved, Prussia had absolute control of foreign

policy and of military resources, which were henceforth organised and disciplined on the Prussian model. Even more creditable to Bismarck's statesmanship was the moderation shown to the defeated state. Against the wishes of the Prussian King, who was carried away by the success of a war which he had only half-heartedly approved, Austria escaped without a military occupation of Vienna, without the payment of an indemnity, and with no territorial loss except that of Holstein. By this means Bismarck avoided making Austria into an irreconcilable enemy, and paved the way for a future alliance which might convert her into a useful tool.

Bismarck had now two outstanding problems to deal with. The great South German states were still independent, and on the grounds of religion, of tradition, and of popular temperament, they were less likely than their northern neighbours to consent to anything that savoured of subjection to Prussia. And outside Germany there was a jealous and dissatisfied France. France, under the Second Empire, had come to regard itself as so far the dominant power in Europe that no great changes on the Continent were to take place without her having a voice in them. Napoleon III had never intended to allow Austria to be crushed. But he had overestimated the military strength of Austria, and that power had been defeated before he could make up his mind to intervene. And the subsequent settlement was still more alarming. It was entirely opposed to the interests of France that Prussia should gain such an increase of strength, and still more that she should link up the Rhenish provinces with the central dominions of the monarchy. To acquiesce in such a settlement without claiming some compensation for France would complete the discredit in which the Empire was already involved by the failure of the Mexican adventure. With ultra-Machiavellian astuteness Bismarck set himself to make the one problem solve the other. French ambitions were of necessity opposed to German interests, and a successful

war with France would overcome the obvious objections of the South German states to union with Prussia. By feigning willingness to find some satisfaction for Napoleon, he induced the Emperor to state his demand for the Rhine frontier. This demand was communicated to Bavaria and Würtemburg, and these states were thereby induced to make secret treaties with Prussia. It now remained to force France into war, and, in the state of public opinion in France, this was not a difficult task. A foolish attempt on Napoleon's part to seize Luxemburg was frustrated by Prussian opposition, and relations became more strained than ever. The breaking-point was reached when Spain proposed to place a Hohenzollern prince upon the vacant throne of that country. The actual candidature of the prince was withdrawn, but when France pressed for a promise that it should never be revived, any further concession was refused. Bismarck claimed to have altered the wording of the telegram in which this refusal was announced so as to make it read as an insult to France. But such ingenuity was unnecessary. A strong party in France was eager for war, and Napoleon III, ignorant of the military weakness of his country, was impotent to resist it. The war was essentially in its origin a war between France and Prussia, but Bismarck succeeded in making it a war between France and Germany. France was crushed as Austria had been crushed, and treated much more harshly than Austria had been treated. But Bismarck's main purpose was achieved, not when the Empire was overthrown, nor when the French Republic was forced to purchase peace by the cession of Alsace and most of Lorraine, but when, on January 18, 1871, on the unanimous invitation of the princes of Germany, William I accepted the title of German Emperor.

"Blood and iron" had done their work. Germany, with the exception of the German provinces of Austria, was united under Prussian headship, and Bismarck was hailed as one of the two great constructive statesmen of the

nineteenth century. It is inevitable that his work should be compared with that of his only rival, Cavour. At first sight, the instinctive preference of the ordinary student is for Bismarck. His is the more imposing figure, and he seems, in his brutal and cynical parade of strength, to bestride Europe like a colossus. Beside him the maker of Italy appears almost puny, and little more than a subtle and not very honest schemer. But if one analyses the situation rather more closely, and if one compares the position of Prussia after 1815 with that of Piedmont at the same time, and still more the strong tendencies towards unity in Germany with the formidable dividing forces in Italy, the original judgment tends to be modified, and the task of Cavour appears as the greater and more difficult. But the contrast between the manner in which these two great men carried out their unifying work is perhaps more important than the contrast between the men themselves or between their respective tasks. Each step in advance towards the unity of Italy was taken with the express approval of the people concerned. The Prussian statesman deliberately refused to build upon such a foundation. "Not by speeches and votes, but by blood and iron." Cavour could not have uttered such words, for Piedmont had not the military preponderance which Prussia possessed, but the sentiment expressed in these words was the very antithesis of his own policy. It will remain for the historian of the future to determine which of the two great builders was the wiser in his choice of a foundation.

Human nature is so constituted that the popular verdict upon political action is inevitably determined by its success or its failure. Because Germany was united in a particular way, men jump to the conclusion that that was the only way in which union could have been brought about. Because German unity had been long desired, and because since its achievement it has brought fame, power, and prosperity to Germany, therefore the methods by which it was brought about must be defensible and probably ad-

mirable. If similar methods are necessary to maintain this union, and all the material advantages which have accompanied it, then by all means such methods must be adopted. Such instinctive arguments as these go far to explain some of the most puzzling problems of modern Germany. Why are the Germans, naturally very diverse in character and in outlook on life, so unanimous on certain questions, and so submissively receptive of opinions dictated from Berlin? Why has the South German, a peaceful, placid, pleasure-loving man, submitted to be Prussianised? Why is it, not only that Prussia was allowed to swallow Germany, but that Germany has not resented it? The answer is that the average German, with his power of acquisition and his love of systematised knowledge, is the most teachable of men. And the South German is also one of the most sentimental of men. What he loves is a legend, something which becomes part of his very nature. Bismarckism, and the conviction that Bismarckism was needed to create German unity and German greatness, have become such a legend; and in forty years, thanks to the pressure of a highly-organised military system and an equally highly-organised system of State-guided education, this legend has become a gospel.

It is extremely difficult to cast doubt upon a legend which has been piously accepted by a whole nation, and perhaps still more difficult to plead for a hypothesis against the evidence of accomplished fact. And yet it may be held with some confidence that a united Germany—not precisely the modern Germany, but perhaps a better and more balanced state—could have been created without the employment of the crude and brutal measures of Bismarck. It is not necessary to lay too much stress upon the Parliament of Frankfort and the refusal of 1849. But in subsequent years there were powerful efforts to bring about German unity under Prussian leadership (*Bundesstaat mit preussischer Spitze*), and these only required the resolute and cordial support of Berlin to be successful. The years in which the prospects of success were brightest were from

1860 to 1862, after Austria had been beaten in Italy and before Bismarck came into office. At this time a German constitution on sound federal lines was drafted by responsible princes and ministers, and could have been accepted without any of that taint of democracy which had been so distasteful in 1849. But Prussia coveted supremacy, and not mere ascendancy, and refused all support to a constitution which was not due to its own initiative. Bismarck had recourse to a violent surgical operation to bring about a result which might easily have been effected by ordinary medical treatment.

The choice made by Prussia between the alternative methods of uniting Germany is not a mere matter of academic interest. It has profoundly affected not only the subsequent development of Germany, but also the relations between Germany and this country. Britain was as keenly interested in the success of German aspirations as it was in the cause of Italy. The well-known sympathies of Queen Victoria and Prince Albert were on the same side. But Britain has acquired by its own experience a strong predilection for constitutional methods of effecting political change. A frank co-operation between Prussia and the national liberal party in Germany would have had the cordial approval of British opinion. But when Bismarck openly repudiated all alliance with that party, when he paraded his hostility to the Crown Prince and Princess, and when the triumph of Germany was associated with the harsh treatment of France, British sympathy was cooled, and a sense of alienation arose which has never been removed.

Englishmen who are old enough to remember Germany some forty or fifty years ago cannot fail to be impressed by the subtle change which has come over the national character. In those days Germany was a paradise for the traveller of moderate means. Music and the drama were the recreations of a people whose simple family life was singularly refreshing and restful. Nowadays Germany is a wealthy and dominant state, but its life, especially in

the larger towns, has lost most of its attractions to the traveller in search of peace. Berlin has become a centre of dissipation, only differing from that of Paris or Vienna in its cynical coarseness. Everywhere the military dominates the civil element in social life. This change was foretold at the outset by an eminent diplomatist, who had made a special study of Germany, in words which are worth quoting: "Such unparalleled successes as those which have attended the German arms, and the consequent absolute power which the German nation has acquired over Europe, will tend especially to modify the German national character, and that not necessarily for the better. Arrogance and overbearingness are the qualities likely to be developed in a Teutonic race under such conditions, not boasting or vainglorioussness. I was painfully struck in my visit to the camp at Metz in October by the extraordinary difference I witnessed in this respect between the language and *tenue* of the officers I met there and those I had observed in the days which preceded the invasion of France. Is it love of exaggeration to fear that under such circumstances the German Empire, based on universal suffrage—*i.e.* on the suffrages of the 800,000 men who have been fighting in France—and beginning life under the direction of a Lieutenant-General who has been present during the whole campaign [*sc.* Bismarck], may have some of the faults of militarism attaching to it?"[1] It is difficult to believe that these words were written by Sir Robert Morier as long ago as 1871.

The scheme of this chapter does not require a chronological survey of German history after Prussia had completed the task of substituting a coherent Empire for the discredited confederation of 1815. But it is necessary to say a few words about the genesis and character of the ambitions which at the end of forty years of peace have brought Germany face to face with a vast hostile coalition. The

[1] *Memories and Letters of Sir Robert Morier*, 1826 to 1876 (London, 1911), vol ii. p. 243.

first and inevitable result of the defeat of France was to give to Germany a predominant voice in the affairs of Europe. As long as Bismarck continued to guide the helm of state this predominance was unquestioned. That statesman was content to safeguard the position which he had won, and, as long as he could prevent any combination among possible opponents, his task was comparatively simple. The obvious enemy was France, which could neither forget nor forgive the loss of the border provinces, and the possible allies of France were Russia and Great Britain. France single handed was impotent, and the primary task of Germany was to secure the isolation of France. This was not difficult while France and Britain were divided by rival interests in Egypt and in other parts of the world, and while France was sundered from Russia by long traditions of antagonism and by the instinctive antipathy that existed between a highly democratic republic and the most autocratic of European monarchies. Such danger as might arise seemed to be more than met when, in 1879, Austria became a subservient ally, and still more when, in 1882, Italy, jealous of French advance in northern Africa, became detached from its Latin neighbour and was rather reluctantly shepherded into the fold of the Triple Alliance.

The Triple Alliance was defended as a security for European peace, and so it was as long as its aim, the maintenance of German ascendancy, could be achieved without violence. But Europe has never been tolerant for long of the domination of any one state. The balance of power is not a mere doctrine—it is based upon the instinct of self-preservation. The same forces which in the past produced the coalitions against Louis XIV and against Napoleon were bound sooner or later to lead to a hostile combination against William II. The interests of Austria and of Russia in the Near East were diametrically opposed, and the support of Germany gave to Austria a commanding position which Russia could not but resent and resist. The in-

evitable result was a gradual approximation between Russia and France which developed into the entente of 1896. Matters became more serious still when Britain began to emerge from the isolation which had been so marked at the time of the Boer War, and set herself to remove or diminish the causes of mistrust which had so long kept her apart both from France and from Russia. Veteran diplomatists shook their heads when the diplomacy of Sir Edward Grey put an end to the soreness associated with Egypt, with Fashoda, and with the Dreyfus incident, and concluded an *entente cordiale* with France. This led, in spite of difficulties in Persia and the Far East, to a better understanding between Britain and Russia. And so the great powers seemed to be definitely grouped into a Triple Alliance on the one hand and a Triple Entente on the other. German ascendancy, so long established that it had come to be regarded as a right, was now definitely challenged. The evidence of the new state of things became clear when Britain backed France in the Morocco dispute, and when Russia hesitated to assent to the absorption by Austria of Bosnia and Herzegovina. Germany had become so arrogant that resistance to her will was regarded as an aggressive and provocatory action. The Emperor, who combined a love of domination with a command of epigrammatic phrases, showed his growing uneasiness by talking of his "mailed fist" and his "shining armour." The military machine which had been so irresistible in 1866 and in 1870 had lost none of its efficiency in the interval of peace. The maintenance of German ascendancy demanded that it should be employed to break through the passively hostile ring which threatened to strangle Germany. The weakening of Russia by the war with Japan postponed an outbreak and enabled Germany to humiliate Russia in the matter of Bosnia and Herzegovina as she had previously humiliated France by insisting on the retirement of M. Delcassé. By submitting to a series of such actions on the part of the Emperor Europe could purchase an unlimited

continuance of dishonourable peace. But there is a limit to such endurance, and the Serbian question was to provide a final test. If Russia had consented to allow Serbia to be degraded as well as punished for its alleged complicity in the murder of the Archduke Ferdinand, the Emperor would have complacently restored his drawn sword to its sheath. But Russia would not bend so far, and Germany struck, though by so doing she freed Italy from the defensive obligation imposed by membership of the Triple Alliance.

Although the determination to maintain German hegemony in Europe was the chief cause of the war, it was not the only cause, nor would this in itself have sufficed to account for the world-wide enmity and alarm which Germany has aroused. While exulting in their military strength and efficiency, Germans have sought for arguments to justify their claims to themselves as well as to others. The history of the Middle Ages has been ransacked and largely rewritten by erudite patriots to prove that the mantle of imperial Rome fell upon Germany, and the Holy Roman Empire, whose history is a standing witness to the political incompetence of Germany, has been refurbished to vindicate for the Hohenzollerns the grandiose power and pretensions of the Karolings, the Ottos, and the Hohenstaufen. And the German reading of history does not content itself with a revised interpretation of the past of its own state. The German Empire is, after all, only a small part of the territories which German valour and German ability have gained. Why should a union which has bound together Prussia and Bavaria, Saxony and Würtemburg, stop at the purely arbitrary limits of modern Germany? Pan-Germanism holds that the Empire, if it is to be really German, must include the whole German race and the lands which it has occupied. This is a large demand and would involve a reconstruction of the map of the world. But there are certain small though attractive fragments of the greater Germany with which the process of absorption might begin. The Netherlands and the greater part of Switzerland were

actually parts of Germany in historical times. Through the Netherlands the historic river of Germany runs into what is now only in name, but should become in reality, the German Ocean. And once the argument for absorption is admitted, it will carry one very far. Scandinavia has a Teutonic population, and its annexation would give Germany that entrance to the Baltic which it has been compelled to evade by the making of the Kiel Canal. Great part of northern France was once Frankish, as its name implies. And, just on the other side of the Channel lies England, the adopted home of Jutes, Angles, and Saxons. To the extreme Pan-German enthusiast the British Empire and even the United States should form part of a vast confederacy whose political centre should be Berlin.

These colossal aspirations may be dismissed as mere dreams, but the dreams of a great nation are not a negligible matter, and within practical limits they may guide or inspire political action. And in the case of Germany, the craving for expansion was strengthened by motives which were at once more material and more intellectual than the appeal to historical ethnology. In 1879 Germany, which in the days of the early *Zollverein* had leaned towards free trade, adopted a policy of strict and scientific protection. To a protective state colonies are always more attractive than they are to one that discards artificial restrictions of trade. And to Germany, expanding at once economically and numerically, colonies became an object of passionate desire. Without them the German could only emigrate at the risk of losing his nationality. Unfortunately desirable colonies were not to be had without despoiling some other state. This might be denounced as robbery, but it was remembered that robbery had been condoned before as a sort of missionary enterprise. If other countries had possessed the right to extend their dominions as a means of spreading civilisation or religion, surely Germany, which had come to believe its people of finer moral fibre than the degenerate inhabitants of the neighbouring states, could

not be denied an equal or even a superior right to raise and extend the standard of civilisation. This conception of a sort of divine mission has become an obsession among a people whose sense of humour has been dulled by extravagant self-esteem. Emperor, professors, preachers, and politicians have combined to sound the praises of German *Kultur*, and to demand that Germany shall have a " place in the sun " for the good of the whole world.

These ideals have carried German ambitions far beyond the bounds of Europe. In fact, Europe has for many years ceased to have a restricted life and politics of its own. The Germans themselves have coined the word *Welt-Politik*, which most aptly expresses the expansion of political outlook. But to enable a state to play a due part in the affairs of the world, military strength must be supplemented by naval power. As the German navy grew and became the idol both of ruler and of people, the sense of antagonism to Britain gained greater and greater intensity. Of what avail was it to build and man a great fleet if an island power with older maritime traditions was strong enough to block the outlets from the North Sea ? Hence the British navy became the German bugbear. It stood between Germany and German expansion, and it deprived Germany of the power to teach its *Kultur* to the world. But in spite of German claims to ethical and intellectual superiority, it is doubtful whether the world has any deep-seated desire to derive the blessings of civilisation from a state which has given such evidence of superior morality as is afforded by the deliberate assertion of the right of a great power to disregard treaty obligations, to trample upon a weaker neighbour whom it was pledged to defend, and to wage war with a cynical brutality which mankind has been struggling for generations to soften.

II

GERMAN PHILOSOPHY

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How are we to describe or estimate the contribution of a nation to philosophy? Great philosophy, like great poetry or great science, knows no national boundaries. It is a possession of the world. It is the work of genius, and the wind of genius blows whither it listeth. Nietzsche describes music as the new universal language of Europe. Might the same not be said of all the great achievements of the human spirit? Individual philosophers, like individual poets or scientists, are yet human, and may, with the rest of us, be caught up in the net of circumstance which makes us fight and destroy one another and regulate our behaviour to other men as they happen to have been born within this or that national boundary, makes us even see that such action is in this present distress our highest duty, but they will still hold it blasphemy to allow such divisions or enmities to enter into the realm of philosophy. That were "to do it wrong, being so majestical." We can be glad that the Germans have been great enough to go on performing Shakespeare, sorry that they are so small-minded as to give up their English honorary degrees. We would think of their philosophy as we would have them think of Shakespeare.

Nevertheless with "the same spirit, there are diversities of gifts," and we may the better appreciate the common heritage of European nations if we seek to assess the contributions made to it by different nations, and especially by the nation with whom we are at war. In the history of

modern philosophy which begins in the sixteenth century there appear great names of English, French, Italian, and German philosophers. Philosophy is neither the possession of, nor has it been contributed by, any one nation. But no one can deny that Germany's contribution has been as weighty and important as any other—most critics would judge it to be the weightiest and most important.

There are two ways in which we may try to assess the contribution by a nation to philosophy. We may think of philosophy as a system of impersonal truths, like the mathematical sciences, bearing on them no impress of their discoverers; for they have lain hid from the beginning of time in the depths of reason, waiting to be discovered. The Greeks preserved the names of the discoverers of the elementary truths of mathematics, and a Greek in the fourth or third century might, in looking over their names, have asked whether more had been achieved in mathematics by Cyrene or Athens or the Pythagoreans of South Italy. So we might run over the names of distinction in modern philosophy and select those that are German—Leibniz, Kant, Fichte, Hegel, Herbart, Schopenhauer, Lotze, among them—set them over against Bacon, Hobbes, Locke, Berkeley, Hume, Reid, and J. S. Mill, and ask which nation had achieved most. Such a procedure would be of little value. Philosophy cannot be regarded as a sum of discoveries, and there are no simple scales in which to weigh the importance of different philosophical truths.

We might, indeed, give up comparisons and try to enumerate or expound those philosophical truths which happen to have been discovered by Germans, but that would be to write a history of philosophy with many and arbitrary omissions. We should have to ask whether these truths just *happen* to have been discovered by Germans, or whether there is something in the German nature which explains why they made just the contributions they did.

Once we begin to consider the question in this way, we should soon see that there is much in philosophy which is

not impersonal—that philosophy, as an expression of national character, is more like poetry than science. English poetry is not the possession of England alone, and it has within itself the most abundant diversity of character. Yet it is always thoroughly English. English poets, however much they differ among themselves, display certain common characteristics as compared to French or German or Italian poets. This is, of course, as it should be, for poetry is " impassioned truth," and as such must bear the impress of personality. It is more surprising to find critics agreeing in finding English characteristics in all English philosophers—finding, in fact, that this impress of personality is borne also by philosophy. For the character of philosophy is twofold. Philosophy is in part concerned with the discovery of certain abstract and *a priori* truths, as impersonal and unnational as the truths of mathematics. It is also concerned to answer those ultimate questionings about the nature of the universe and the destiny of man which arise in all men's minds. These questions are not born of the intellect alone, and it is not by the intellect alone that men's answers to them are determined. Hence philosophy in this second sense is more akin to poetry than to science, and is a more intimate expression than is science of human personality.

Men's answers to these ultimate questions about the nature of the universe have taken two forms, distinguished sometimes as critical and dogmatic. Some philosophers have held that these questions admit of no answer—that it is in the nature of human reason to ask questions which it cannot answer. They have therefore set themselves to mark out the limits of our knowledge, to make clear by reflection what we can know and what we cannot. Others have refused to believe that limits can be set to reason, and have maintained that philosophy can answer these ultimate questions, either by pursuing a particular kind of reasoning or by reflecting on the whole of human experience. The result of such reflection is commonly expressed in what is called a metaphysical system. The

choice of criticism or of dogmatism seems to depend upon or to be an expression of character. "The English," says the Danish historian of philosophy, Höffding, "do not care to shoot in the air; they prefer to hit the mark, even should the roar of their artillery be less imposing." It is characteristic of English philosophy to be critical and cautious, to keep a firm hold on the immediately practical, and to fail to see what is beyond the range of the practical man. German philosophy, on the other hand, is almost always systematic, and, with the notable exception of Kant, and, if he is to be counted as a philosopher and not as a poet, of Nietzsche, has produced metaphysical systems. In the production of metaphysical systems the German genius is supreme. For that task requires a union of two qualities, both eminently German. Metaphysics is an attempt to think things as a whole. It begins, therefore, with a survey of the whole field of human knowledge. That requires the patient thoroughness and vast industry in which the German has never been surpassed. But it is not simply a survey or a chronicle of details; it attempts to pierce beyond the superficial diversity and penetrate their secret meaning. That requires what is at its best a peculiar daring and profundity of thought, or at its worst an arbitrary certainty and naïve credulity which are also very German. The same nation has produced the dry-as-dust and the romantic fairy-tale. Metaphysical systems often purport to be impartial reason, thinking the world as a whole. Actually no one can apprehend the whole of things. Actually the metaphysician seeks in experience for the intelligible as the poet for beauty, and, like the poet, makes what he has found the symbol of or the key to the whole that is beyond his immediate apprehension. However much, then, he may begin with the apprehension of necessary truths, his system is not a discovery, but a construction; it is based on selection and choice; it cuts loose somewhere from the bonds of actual fact or necessary truth. That it does so is not a defect. If metaphysics,

like poetry, is a venture of the spirit, it is not, any more than poetry, an illusion, and metaphysics, in virtue of starting from a wide survey of knowledge, has peculiar gifts of understanding and illumination. In England we mostly like our philosophy or our poetry neat, and English philosophers have had more affinities with science than with poetry. It would be difficult to find less poetic authors than Locke, Hume, or Bentham, typical English philosophers. Hume called poets "liars by trade," and most English philosophers, though more polite, have not been much more appreciative of poetry. In Germany, on the other hand, there has always been a close relation between poetry and philosophy. The first question a German asks about a philosopher is, "What is his *Weltanschauung?*"—his world vision. We could naturally talk of the world vision of Shelley or Wordsworth, Browning or George Meredith; there would not seem to be much meaning in talking of the "world vision" of Locke or Hume or Bentham. Hence the great English poets have more affinity to German than to English philosophers, as is abundantly shown in Coleridge's *Biographia Literaria*; for in England men go to poetry for just that kind of inspiration and illumination which in Germany has largely been given by philosophy. This is evident throughout the history of German philosophy, but never more so than in the great period of German philosophy and poetry, the end of the eighteenth and the beginning of the nineteenth century. This is the age of the great philosophical poets, Schiller and Goethe, and of the philosophical school which has been called the school of romanticism. Only Germany could have produced a philosophy which could be called romantic, and that Germany could do so is a mark alike of the greatness and of the defects of her philosophical achievement.

I

German philosophy may well be regarded as the most characteristic contribution which Germany has made to

the common treasure of the human spirit, and that for two reasons. Firstly, as we have said, metaphysical systems require for their production a union of qualities which is found most strikingly in the Germans. Secondly, the Germans express in philosophy their world vision, and the difference in men's world visions is largely, though not altogether, due to the difference in men's personalities. German philosophers at any rate have, more than any others, professed to interpret the world in the light of personality. The characteristics they display are described by Eucken, himself a German—" a breadth and universality which seek to throw away nothing but retain everything, a longing for system which forces all diversity into a single complex, and thereby vigorously transforms things as they are first discovered, an effort to find a standard within the soul and from that to understand the whole world; in all great movements and great dangers; the danger of carrying dead ballast and of trying to reconcile the irreconcilable, the danger of an overbold speculation which loses sight of reality and blunts the immediate impression; the danger, finally, of a formless subjectivity which buries itself in itself; with all this, however, a grand manner which raises thought and life to a higher level." [1]

Two things are of special note in this catalogue—" a longing for system " and " an effort to find a standard within the soul and from thence to understand the world." For it is with the revolt of human freedom against the lifeless chains in which the mechanical system which the human mind erects in science threatens to bind it that German philosophy is always concerned, and German philosophy itself shows a curious reflection of the struggle between overmastering system and freedom in its own history, where the assertion of the freedom of the spirit is expressed in systems themselves often rigid and mechanical. " The great movement of German philosophy," says the late Master of Balliol, " was above all an attempt to find a

[1] Eucken, *Lebensanschauungen der Grossen Denker*, p. 369.

way *through* the modern principle of subjective freedom—the very principle which produced the Reformation of the sixteenth and the Revolution of the eighteenth century—to a reconstruction of the intellectual and moral order on which man's life had been based in the past." "It is a leading characteristic of German thought," says Höffding, "from the mysticism of the Middle Ages onwards, that it asserts the independence, inwardness, and validity of spiritual life, and bases its conception of the world on this assumption." Even Hegel, the most conservative of all German philosophers, recurs again and again to the freedom of the spirit. "Thus was raised," he says in an address on Luther, "the last banner around which the nations gather—the banner of the free spirit which, in apprehending the truth, still abides with itself—which, indeed, can only abide by itself as it apprehends the truth. This is the banner under which we serve and which we carry."

It is a curious paradox that service under such a banner has never led to a great comprehension of political liberty, that Hegel, for example, in his political writings, abuses individualism and deifies the State—even the Prussian State before 1848. The explanation of this paradox is that freedom essentially implies something *from* which the spirit is free, whatever that something be—the power of sin or circumstance, the devil or a mechanical world. No doubt it is true, as German philosophers are never tired of pointing out, that merely negative freedom is an abstract conception. "I do not ask from what you are free, but for what you are free," says Nietzsche. Nevertheless the negative side of freedom is essential to it, just as something to be acted on is essential to action. The assertion of the freedom of the spirit is of inestimable value in face of a philosophy which began by conceiving nature as a machine, and became so hypnotised by the consideration of the wonderful mechanism which it contemplated that it forgot that a machine implies a machine-maker or user, and that the lifelessness and rigidity of the

machine is itself an instrument of liberty to the spirit that uses it. But such an assertion, if it is not to defeat its own ends, must be a demonstration of the compatibility in the world of freedom and mechanism, actor and circumstance. If the assertion of the absoluteness of the spirit means that the spirit swallows up circumstance and spirit becomes the whole reality, then nothing is left for the free spirit to do and no material for it to work upon. It is important to show that nature is not so alien to spirit that it cannot be "compelled" by the spirit; it is fatal to conceive the world in such a way that the work of the spirit is thought to be already done. Freedom implies that the spirit and the world in which it is to act are distinct though not alien. It implies that reality is a process of becoming, not something whose nature is uniform and fixed. All the great German philosophers, with the notable exception of Kant, are earnest monists, determined to reveal the world as the expression of one principle. The mystic longing for unity and absoluteness tends to sweep away distinctions—at least to insist on their reconciliation; but distinctions and oppositions are the breath of freedom and moral life. They are, no doubt, distinctions *to be* overcome, but between to be overcome and overcome there is all the world of difference.

We may distinguish the great German philosophers by their different attitudes to this problem of the reconciliation or compatibility of the freedom of the human spirit with the natural world as presented by science, and their ethical theories depend upon the way in which they solve the problem. For German ethical theories are always the outcome of their metaphysics, and cannot be considered separately. Kant was content to show that the two worlds of science and of freedom were compatible. What underlay the compatibility, or what was the real nature of the universe in which such compatibility was possible, he declared to be unknown and unknowable. He was concerned to show the validity of each of the two principles of neces-

sary law and freedom in its own sphere, and to leave it at that. Metaphysics, in the sense of an apprehension of the real nature of the world as it transcends our experience, he argued to be impossible, and for it substituted a criticism of pure reason. His successors did not imitate his caution. Rather it seemed to them an affront to the absoluteness of the human spirit to declare that its knowledge was limited, and, instead of thinking of the human spirit as set over against the nature in which it lives and acts, sought in it a key to the understanding of that nature. Fichte found that key in the moral nature of man, Schelling rather in his artistic activity, Hegel in man's rational nature. The result is that in Fichte and Schelling natural science really goes by the board. Fichte reduces everything to the free Ego, and in dismissing the non-spiritual world in which the self is to act, he leaves the self no ideal but the achievement of its own abstract freedom. Schelling endeavoured to construct a philosophy of nature, and it was one which insisted on the absolute unity of subject and object, which made all distinctions unmeaning, and left no room for morality or science. Hegel made a notable and illuminating attempt to display reason objectified in the world of history, but in consequence had little patience with the actual display of individuality and all noble rebellious action which is inspired by the knowledge that the world as it is is not rational. The human spirit was instructed that it was so absolute that all reality was informed by its nature, and that, therefore, discontent with and rebellion against that reality was ungrateful and vain. Ethics practically disappears as an independent inquiry, and an understanding of the rational nature of the state takes its place.

A philosophy which seems to teach that whatever is is right speedily produces a reaction. In Schopenhauer we find the hatred of those who say peace when there is no peace expressing itself in a passionate conviction of the reality of evil and pain. Against this gloomy background the free activity of the spirit is but the keenest element in

the tragedy, and the true aim of man becomes the denial and abnegation of that fatal will to live, the cruellest invention of the blind will that rules the world. As the opposition between the individual will and the world is again recognised, an independent moral theory is again possible, but it is a theory of asceticism and abnegation. Lastly Nietzsche, whilst accepting Schopenhauer's account of the world and his hatred of an optimistic rationalism, rejects his abnegation of the will to live. His human spirit is one which has stripped itself of all illusions, needs no support in the false assurance that the universe is on its side, but is content with the mere joy of living dangerously. If, then, the earlier romantic philosophers tried to describe reality as though there was nothing that needed to be done by the free spirit, Schopenhauer and Nietzsche describe it in a way that suggests that there is nothing that the world calls upon us to do. The former make nature and the spirit too akin for action, the latter make them too alien. Kant alone, just because he refused to enter into speculations as to the ultimate nature of the universe, which contains both nature and man, both asserted the freedom of the spirit and left it a world in which to act. "Two things," he declared, "fill the mind with ever new and increasing reverence and awe—the starry heaven above me and the moral law within."

II

If we now try to consider the work of German philosophers more in detail, it is with no intention of giving an account of their work. A short account of great philosophy would be as unsatisfactory as a short account of Shakespeare. If Fichte's or Schopenhauer's "world-vision" were briefly described, it might well seem merely fantastical; it would certainly seem arbitrary. But read Fichte or Schopenhauer, and follow their thought, and though you may dissent from their conclusions and think many of their

inferences unwarranted, you will have nevertheless gained illumination and understanding, as you will have thought through with them certain aspects of reality, just as the man who reads or sees *Hamlet* with appreciation will have acquired more understanding not only of Shakespeare's thought, but of human nature, though a summary of the play would have left him uninterested and unmoved. I propose only to consider how the general characteristics of German philosophy which I have noticed, are exemplified in the work of the different philosophers.

German philosophers may be considered in four divisions (the division is chronological, but otherwise rough and rather arbitrary; still it will probably prove convenient). First Leibniz and Wolff, then Kant; thirdly the romantic school, Fichte, Schelling, Hegel, and Schopenhauer, and lastly, German philosophy since 1850.

Leibniz was born in Leipzig in 1648, and died in 1718. He was distinguished by his prodigious learning and his versatility of mind. In the seventeenth century it was still possible for one man to master all the science of the time. Leibniz was not only acquainted with the great mathematical achievements of the seventeenth century, he himself added to them in his discovery of the infinitesimal calculus. He also took a lively interest in the new discoveries in biology which the microscope was then making possible. He was well fitted, therefore, to make the first great attempt at what was to be the high task of German philosophy, the reconciliation of the results of modern science, and especially of the new physical sciences, with the assumptions of morals and religion. He was in his nature a great reconciler. Characteristic of him is the remark that most philosophers are right in what they affirm and wrong in what they deny. He even busied himself with plans for uniting Catholics and Protestants, and, when that failed, for uniting the Lutheran and the Reformed Churches.

His most convincing and lasting contribution to philo-

sophy was his criticism of the distinction between matter and motion which had been made by the physicists of the time, and his argument, which was to be of growing importance in the reconciliation of the claims of science and religion, that the nature of the real must be conceived of as force and not as dead matter. For the conception of a world of things we should substitute, he taught, a conception of a world of centres of force, or, as we now call it, energy. This argument was reinforced and made the basis of a towering speculative construction through the importance attached by Leibniz to the individual. He found in the individual soul the pattern of reality, and the reality of the soul consisted for him in its internal organisation as revealed in thought developing out of itself and not in its connection with the external world. Hence we get the suggestive but fantastic doctrine of monads: that reality consists of souls or monads, that nothing else is real, and that therefore there is no connection between one monad and another. "The monads have no windows." Hence follows the curious denial of the reality of the perception of the external world and the doctrine that all knowledge is a development from within, and yet is knowledge because each monad is representative of the world—a doctrine finally culminating in the fantastic miracle of a "pre-established harmony." God has so arranged that, although there are no windows in the soul and no perception of the outside world, yet the development of our soul is made to harmonise with the development of all other souls, and thus a knowledge of ourselves is at the same time a knowledge of the rest of the world—and all this although the very existence of a God who should arrange this elaborate harmony is not really consistent with the fundamental doctrine of the single reality of the monads.

Immanuel Kant was born at Königsberg in 1724, and lived a quiet, retired life in that city, where he was first *privat-docent* and then professor till his death in 1804. His first work was on physics. He was at first a disciple of

Newton and of Wolff, who had reduced the philosophy of Leibniz to a formal and pedantic rationalism. His early works are largely directed towards a reconciliation of the principles of Newton's physics with the philosophy of Wolff. The influence of Hume and Rousseau gradually led him to a sense of larger and more ultimate problems, and his great work, the *Critique of Pure Reason*, was conceived in 1771 and published in 1781, when he was fifty-seven. It was followed by a *Critique of Practical Reason*, dealing with moral theory, in 1788, and a *Critique of Judgment*, dealing with aesthetics, in 1790.

Kant is the greatest of German philosophers, and yet, as we have suggested, he is not in all respects typically German. He has the German love of system and comprehensiveness. There has seldom been such a systematic philosopher. His system was thought out as one, and he is never tired of insisting on the necessarily systematic nature of the reason and the hopelessness of any procedure which is haphazard or consists of unrelated intuitions. All that he has to say has its allotted place in the general framework of his system, and he often seems to thrust his thoughts into an abstract logical scheme which does not fit them. At the same time he has none of that leaning towards *Schwärmerei* which is found in most German philosophers. He never seeks to obliterate distinctions; he rather revels in them. There is in all his thought a certain stubborn caution which certainly none of his German successors have appreciated. They all took for granted that his philosophy was impossible as it stood, because it ended in a confession of ignorance, in an assertion of the limitations of our knowledge, and a refusal to choose between possible alternative views, and proceeded to "develop" it in various ways, which were not developments, but complete reversals of his chief doctrine.

Kant himself tells us that he was "awakened from his dogmatic slumber" by reading Hume, and to the end he agreed with Hume's distrust of dogmatic metaphysics.

He saw, however, that Hume's scepticism defeated itself, for it claimed to refute the very reasoning on which it was based. Further, it made not only metaphysics, but science, impossible, and reduced morality to a mere play of feeling. There were two things which Kant, for all his criticism, never doubted—the validity of the mathematical sciences and the supremacy of the moral law over all vagaries of circumstance. These, he held, were the deliverance of reason, and, if reason were utterly discredited, as it had been by Hume, these would have to go; yet in the sphere of dogmatic metaphysics, reason, Kant held, had discredited itself, for the use of reason in that sphere seemed only to lead to continual and hopeless contradictions. He suggested, therefore, that it was essential to discover whether there were limits to the use of reason. His work is critical, but, though critical, not negative. The result of the *Critique of Pure Reason* is to vindicate the sphere of reason in science, in our knowledge of the world as we know it in experience, to deny any power of knowledge in matters that transcend experience, such as the being of God and the nature of the soul, and to distinguish between the spheres of science and of moral action in such a way as to show the compatibility of the principle of necessary connection which is the basis of science and the principle of freedom which is the basis of morality. He thus compensates reason for the denial of its power of knowing the supersensible by asserting its supremacy in matters of practice.

To attempt even an outline of Kant's argument would be impossible in an article such as this. It is sufficient for our purpose to note that he vindicates the use of reason in science by making a distinction between the form and the matter of knowledge. He puts his point very clearly in one passage when he says that we can only understand nature if we ask her to answer questions which we ourselves have framed. The form of our questions is dictated by the nature of reason within us. It comes from us, and not from things, and the form of the questions naturally dictates

the form of the answer. We can only know things in so far as they supply answers that will fit into the form of our questions. Science consists of the answers which we get from our interrogation of nature; the form of science, that is all the *a priori* part of science, comes not from nature, but from us. The matter, however, comes from nature, not from us, and the matter cannot be anticipated, but only known by empirical observation, and is given, in Kant's terminology, not by the understanding but in perception. All knowledge involves these two elements, form and matter, or the operation of those two faculties, understanding and perception. Reason, therefore, can give knowledge only in regard to what is given in perception. When it attempts to come by *a priori* methods to conclusions as to the nature of what transcends experience, there can only be the form, and not the matter, and form without matter is meaningless. The principle of necessary connection is a principle used by the understanding in co-ordinating and coming to know the diverse matter presented to the senses in perception. Without it our experience would be but a chaos of unconnected data. It is, therefore, in Kant's words, a principle of the possibility of experience. Yet it is only used to connect what *we* have experienced in separate discrete moments. Let us suppose, for example, that change is a continuous process. Its complete continuity cannot be apprehended by us. We can only observe different stages at different moments. If we are to understand our experience at all, we must learn to connect rightly a stage seen at this moment with a stage that is in the past. In doing that, in finding out whether A rather than B is the cause of C, we must be governed by our perception of A, B, and C. The details of any causal law come from experience. But the real nature of the connection between two stages that we see is not known, only that this stage is to be connected with that rather than with a third, and the general principle of necessary connection is not got by experience, but is prescribed by us to nature in the form of

the question by which we interrogate it. The validity of the principle of causation in science does not warrant us in asserting that things really are determined, and that there is no such thing as freedom. We know nothing as to the real connection of things in themselves. If, therefore, we have any other reason for believing in freedom, science at least has nothing to say against it. When we consider moral action and moral judgment, we find that the notion of moral obligation implies that there is a way in which we ought to act which is quite independent of how we may in fact act, and we cannot say that we have done wrong without implying that we might, if we had so willed it, have done right. For Kant the conception of freedom or autonomy, as we call it, is the fundamental assumption of morality, and its validity is quite compatible with the validity of the principle of necessary connection in the sphere of science. No doubt there must be something in the real nature of things in virtue of which we both can connect what we see of things by the principle of causation and can be ourselves free in action. What that is, however, we do not know, and, according to Kant, cannot know, and there is no use in trying to find it out. Morality implies the freedom of the will, but we cannot *understand* that freedom, for understanding means connecting, and is concerned with what we see, and freedom is the activity of the real self, which is supersensible. In moral action, then, the real nature of man, which, to the mere observer, is hidden behind the way he looks and his outward action, is manifested though it cannot be understood. The moral law, being thus that in which man is free from the chain of outward circumstance, is not derived from facts, and is independent of what a man's inclinations or circumstances may be.

Kant does not, however, base his argument for freedom on the personal conviction that each man may have in himself that he is free. If that were done, every strong personal conviction would claim to be the utterance of

reason, and a man's conviction that he was right would need no further demonstration. Morality for Kant always means *mutual* obligation, and it is displayed not in our personal feelings or convictions, but in our relations with our fellows. Moral judgments imply that we judge others as we would have them judge ourselves, that we expect no more from others than we would have them expect from us, that we regard ourselves as being responsible to them as they are responsible to us. This is the essentially moral attitude, and the principles of action derived from it must be supreme over all mere inclination or pressure of circumstances. If, Kant says, we are, as anthropologists, trying to understand a man's actions, we may explain them by pointing to the force of habits or of inherited character or of circumstance. As moralists, in judging others as we would ourselves, we must recognise that such considerations are not to the point. They are irrelevant to the rightness or wrongness of action.

The supreme principle of morals is called by Kant the categorical imperative. It is distinguished from hypothetical imperatives, such as "If you want to be well or happy or successful, do so and so." The moral imperative is preceded by no "if." It is based on the moral relation of man with his fellows and is thus formulated by Kant: "Always act so that you can will that the maxim of your action should be a universal law."

Kant's moral theory is often condemned as abstract and impossible. It is true that he sometimes seems to think that we can discover what we ought to do on any occasion by merely asking whether it is in accordance with the categorical imperative. The fact is that there is no *a priori* way of discovering what we ought to do, no rule which will dispense us from the responsibility of individual moral judgment. The moral will has got to will something, it has to recognise that from the moral point of view some actions are good and others bad. Nevertheless Kant has correctly described the fundamental basis from which all moral

judgments start, the mutual relation of moral beings. Man is to regard himself as a member of a kingdom of ends; he is to "treat humanity in his own person and in that of others as an end, never merely as a means." That principle will not of itself always tell us what we ought to do, but it is a sure negative test. If we claim for ourselves rights which we are not prepared to allow to others, if we refuse duties which we exact from others, we are flouting the elementary principles of morality.

In the *Critique of Pure Reason* Kant offers a refutation of all theoretical proofs of the existence of God. Speculative theology is an attempt to apply the principles of the understanding, which have meaning only in reference to experience, to that which transcends experience. The fundamental principles of speculative theology, the freedom of the will, the immortality of the soul, and the existence of God, can neither be proved nor disproved by the understanding. In morality, however, we are concerned with something which transcends and is independent of experience, and morality, therefore, may give us a basis for theology, though knowledge cannot. Morality implies, as we have seen, that we are free. It also implies that the difference between right and wrong extends beyond our human existence; it implies that the difference between right and wrong has a more than human significance—it implies the existence of a moral God. The principles which speculative theology sought to prove are, according to Kant, postulates of moral action. We must act as though the will were free, the soul immortal, and as though God existed. Religion, then, depends not on the intellect, but on the will. Speculative theology is impossible, but practical theology is not. The practical reason is for Kant supreme over the theoretical. He "limited reason to make room for faith," and faith for Kant did not mean believing things on insufficient evidence, but the confidence displayed in action.

The chief difficulty in Kant's philosophy is the sharp

distinction he made between the two worlds of knowledge and of action, or of appearances and of things in themselves. Can we believe that we have no knowledge of reality, or that we are concerned only with appearances? All that Kant has shown is that there can be no *a priori* knowledge of reality, and that we can only know things from what we see of them. That justifies a distinction between a thing as it is and what we know of it, for the determinations of any one thing are infinite, and our knowledge must always be finite. Nevertheless we can still say that the more we know, the more we are coming to know of the real. If Kant's argument is sound as against *a priori* knowledge of reality, it is surely not sound as against empirical knowledge. If we cannot know God by *a priori* reasoning, we can surely maintain that we can come to know Him as He is revealed in experience and history.

Kant did not consider this possibility, mainly because he was examining only *a priori* knowledge; and he would still have maintained that theology was concerned with what transcended experience, and could, therefore, not be known empirically. If we seek to draw conclusions as to the nature of the universe from what we know of parts of it, we are not knowing but forming hypotheses which we cannot verify. With such procedure he was not concerned. There is, however, a further difficulty—that, instead of saying that we only know things as they appear, and that they are more than they appear—a justifiable position—Kant often, or indeed usually, says that we know appearances as though an appearance were a mental entity, an impression produced on our mind by a thing. It was open, therefore, for a critic who accepted the position that we only knew appearances—*i.e.* something that is mental—to question the assumption of things in themselves which produced them. This was actually the line of development taken by German philosophy. Kant had made a distinction between what the mind contributed to knowledge and the data which it received. His critics pointed

out that the data were only sensations, and that these were as much mental as anything else; that the distinction between what is given and what is produced by the mind was a distinction within the mind. The object, then, was not to be thought of as the non-mental as opposed to the mind, but as that which the mind must think as opposed to what it may or may not think—that in itself over which it has no control as opposed to that over which it has control.

Fichte (1782–1814) is the first representative of this line of thought. He protested against the absurdity of the thing in itself as a gratuitous assumption, which was the great flaw in Kant's philosophy, and maintained that both the subject and object in knowledge were to be thought of as mental or spiritual, that the distinction of subject and object was a distinction between the individual ego and what limited it. With this position he combined Kant's doctrine of the supremacy of the practical reason, and taught that the essence of the self lay in acting and willing—in overcoming the limitations with which it is confronted in knowledge. The self finds itself confronted with what seems to be other than self, limiting and restraining its activities. In action this opposition is overcome and complete reality manifested. Therefore we must conceive of reality as a self that is active, differing only from ourselves in not being finite and limited, or in having overcome the limits by which we are hampered—being, in short, a trascendental self or ego. Our duty is to get rid of all limitations, all limiting desires or hampering of circumstance which keep us finite, and develop the full freedom of the spirit which is complete reality. Fichte's philosophy would seem a monument of egoism but for his insistence on the distinction between the empirical self and the transcendental. All that we ordinarily call the world as opposed to ourselves he would not call an illusion. It is real enough as that which limits or is other than our actual empirical selves. Illusion only arises if we think that its ultimate nature is alien to us, if we do not realise that any concep-

tion of it as merely a limit is abstract and unmeaning, that it is a transcendental self. Fichte is, in fact, interpreting all reality in the light of what we find in ourselves. We are to begin by distinguishing between appearance and reality within us, and to find the real in our moral will, and judge everything else by that standard. However much Fichte may have thought he was following Kant, his whole method and spirit of philosophising differs from Kant's as completely as could well be imagined. He finds in moral action, as he conceived it, something completely intelligible and satisfying, and says that reality is therefore of that nature—a method of procedure which contradicts Kant's whole teaching. Further, it is to be noted that, although he follows Kant in making the moral nature of man supreme, his system really undermines morality; for the self, interacting not with other selves, but with the transcendental self, has little concern for that respect for mutual rights and duties which for Kant was the foundation of the moral law. Morality becomes the assertion of the will that it will be free—an empty and dangerous abstraction.

The romantic tendency which is apparent in Fichte became more pronounced in Schelling (1775–1854). He concerned himself with the implications of moral conflict, and sought to expound nature as the revelation of the spirit. Art, which is inspired with the consciousness of harmony between the mind and nature, was for him the highest form of knowledge, and he attempted to evolve a philosophy of nature which drew its material from art, and not from science. The result was not of great value. Art cannot be called upon to do the work of science, and Schelling's philosophy of nature consists of somewhat vague generalities in which all distinctions are obliterated—" the night in which all cows are black," as Hegel called it.

Hegel (1770–1831) is the greatest of the romantic philosophers. He recognised from the first the dangers of the subjectivism of Fichte and the indiscriminate vagueness of Schelling, and set himself to give an account of reality

which would do justice to the richness and diversity of concrete fact and yet assert the essential unity of the world. For him the real is the rational and the rational is the real. His test of rationality is concreteness, and he adds that the concrete is only reached through abstractions which are overcome. Thought is always abstract to begin with, but each abstraction refutes itself and leads to its opposite. If, like Fichte, we seek all reality in ourselves, we must so conceive the self that it becomes the world, and there is no room for the self as distinguished from the world. The subject is only known as over against the object, and the object as over against the subject; each taken in itself is abstract, taken both together and yet distinguished they are concrete, and real. The intelligible is not, then, to be discovered by our looking into ourselves alone and using what we find there as a key to what is outside, but by our looking also into the world as we know it and find it to be rational. Not abstract reasoning, but study of the world, will accomplish the task of philosophy. What we see of the world at any one moment, or by the various methods of science and intuition, is abstract and imperfect. We know it as real in so far as we see it to be rational, and philosophy's business is to display the rationality of the real as it is presented to us in science and in history.

Hegel was a man of immense knowledge and patience. He conceived the task of philosophy to be the thinking together, the seeing in their mutual relation, all the various facts presented in isolation by the separate science. Science, he held, is necessarily abstract, because it concerns itself with one aspect of reality at a time, and studies only that. Yet these different aspects do not exist in abstraction, they are all part of one concrete whole, and if we want to know things as they really are we must strive to see them in their relation to one another and to the whole. For this task, the task of justifying history and fact to reason, Hegel was eminently fitted, and in the success with which he achieved it lies the great and abiding value of his work.

He thought through an immense mass of facts which to most men are only half understood because they are only seen in isolation. No one can read a book like the lectures on Æsthetic or those on the Philosophy of History without feeling the illumination of Hegel's mind. When he is dealing with facts and exhibiting to us their rationality and showing us how seeming oppositions can be overcome, we can only appreciate his wisdom; only we must insist that if the task of philosophy is to be so conceived, facts must be there for philosophy to understand. There are times when Hegel himself insists on this. "Philosophy, as the thought of the world," he says in a famous passage, "does not appear until reality has completed its formative process and made itself ready. History thus corroborates the teaching of the conception that only in the maturity of reality does the ideal appear as counterpart to the real, apprehends the real world in its substance, and shapes it into an intellectual kingdom. When philosophy paints its grey in grey, one form of life has become old, and by means of grey it cannot be rejuvenated but only known. The owl of Minerva wings its flight only when the shades of night are gathering," and again, "To apprehend what is is the task of philosophy, because what is is reason. As for the individual, everyone is a son of his time: so philosophy also is its time apprehended in thoughts. It is just as foolish to fancy that any philosophy can transcend its present world, as that an individual could leap out of his time or jump over Rhodes. If a theory transgresses its time, and builds up a world as it ought to be, it has an existence merely in the unstable element of opinion, which gives room to every wandering fancy." [1]

Philosophy in this view should surely be represented as something essentially imperfect and as in a state of development, for all philosophers are sons of their time, and the world in which they live is still changing, and they are limited in their knowledge even of the world of their own

[1] Hegel, *Philosophy of Right*, Preface.

time. How are we to know when the world has "come to maturity"? Hegel unfortunately sometimes writes as though his philosophy were final, as though in the beginning of the nineteenth century the world were complete and had only to be known. His insistence that we could know nothing which was not real, produced the conviction that there was nothing real which we could not know, and that the empirical limits of the human mind and its definite place in the time series could somehow be transcended in philosophy. The result is that when facts will not fit into his logical scheme, he often seems to say, "So much the worse for the facts," that he tends to confuse the process of knowledge by which we come to know a reality which has been true all the time with the process of change in things, and so to substitute for the concrete individual facts a scheme of abstract categories. For all Hegel's realism there was in him much of that German love of the transcendent, that impatience with the limitations of time and place that thinks the understanding of the end to be attained the same as the attaining of it, and the ideal more real than the actual. Hegel is not to be tempted away from the actual by the ideal, but he sometimes insists, in spite of the most manifest facts, that the actual is itself already ideal.

In no region was this transcendental tendency of Hegel's more unfortunate than in ethics. For, as we have said, a morality which is not founded on opposition, on the contrast between what is and what ought to be, between the actual and the ideal, is worse than useless. Hegel in his revolt against abstract ideals refused to devote a separate inquiry to moral theory, and so put what he has to say about ethics in his *Philosophy of Right*, his analysis of the state. For only in society and under the government by the state is the concrete moral life possible. In the state morality has got itself made actual and realised. The state therefore is "God walking upon earth."

Hegel did good service by insisting on the moral nature of the state, but his dislike of any ideal which was not con-

crete made him sometimes preach only a political morality. But the morality that is incorporated in political institutions can never represent more than the average morality of the citizens of the state. That state will be in a parlous plight some at least of whose citizens have not higher ideals than the law recognises, who are not in revolt against the state as it is for love of the state as it ought to be. The political doctrines of natural right may suffer from being abstract, but they are of inestimable service in laying down a standard by which the state itself is to be judged. Hegel's idealisation of the actual made him in practice a defender of the Prussian state and an opponent of the German Liberalism which was seeking to reform it. The doctrine of the free spirit was perverted into that vile defence of tyranny which tries to persuade the man who is struggling against oppression that he is free already. "That roar, 'What seek you?' is of tyrants in all days." There is no great difference between the state in Hegel's accounts of it and that modern German apotheosis of the state which is prepared in the name of the state to destroy all that makes the state worth having.

The philosophy of Hegel was supreme in all German universities in the first half of the nineteenth century. Its combination of realism and transcendentalism, however, led to a division among his followers, some of whom endeavoured to make his "world vision" less pantheistic and more theological, while others, notably Marx, emphasized the realistic side of his teaching, and prepared the way for that materialism which was fostered by the great revival of science in the nineteenth century. A more immediate reaction, however, against his whole philosophy appears in Schopenhauer. Schopenhauer (1788–1860) is a Romantic philosopher, for he finds in his own experience the key to the universe. He is in complete revolt against the assumption which had dominated all his predecessors, that of the rationality of the universe. That assumption, he thought, had made men deny the most obvious facts of pain and evil.

Himself intensely conscious of suffering and discord in himself, and keenly sympathetic with sufferings in others, he felt the existence of pain and evil the most evident of facts. If the assumption that the universe was rational meant that that fact was explained away, that only showed the futility of the assumption.

Schopenhauer was, therefore, an anti-intellectualist. He went back to Kant and accepted Kant's doctrine of the limits of human reason. The understanding he taught is concerned only with ideas, and tells us nothing of the nature of the world. But he differed from Kant in holding that we can know the nature of the world. Its reality is will. It is revealed in the striving and restlessness within us and in art, especially in music, which is concerned not with ideas but with will. Since Schopenhauer distinguishes sharply between will and intellect, his will is only a striving, irrational and blind. We are all the products of this blind will which is the world. We live not because we know that the life is good, but because the will impels us. When we understand the truth, and see that the will is evil, we shall learn to deny it. Quiescence, then, is the true end of life, and sympathy and asceticism the principles of virtue. Actions are good in so far as they are selfless, in so far as they deny that restless will to live which is implanted in us for our misery.

Schopenhauer's philosophy is perhaps more subjective than any other, a vivid and powerful expression of his own temperament in the guise of an account of reality. It is in its poetic qualities that its value consists, in its expression of one side of life which philosophy had tended to ignore, and in its noble refusal to deny facts because they are disagreeable.

Since Schopenhauer there have been no names in German philosophy fit to rank with the great names of the end of the eighteenth and the beginning of the nineteenth century. The rapid growth of science led to a reaction against the Romantic school which expressed itself in

materialism. Dissatisfaction with Hegel has led to a revival of Kantian philosophy and to renewed attempts to reconcile in one "world vision" the mechanical assumptions of science and the claims of religion and ethics. As a whole, however, there has been in German philosophy since 1850 great industry and knowledge but little vision. Much serious and valuable work has been done in the history of philosophy, and more especially in experimental psychology. There is no one among recent German philosophers to compare in creative thought and illumination with Bergson, and the most interesting and fruitful development of Hegel's philosophy does not come from Germany, but from Italy, in the work of Croce and Gentile.

Nietzsche perhaps deserves some separate notice. He is very different from most German philosophers, for he has no system, and indeed abhorred systems. It is doubtful whether he ought to be considered as a philosopher at all; for a philosopher surely seeks truth by thinking, and at any rate tries to be consistent. Nietzsche finds truth in isolated intuition, and cares nothing for consistency. He followed in his writing not German but French models, and most of his works are written in short isolated paragraphs, often extremely enlightening and suggestive, but not forming or being meant to form a coherent whole. His greatest work, *Thus Spake Zoroaster*, is manifestly poetry, and poetry of a very high order. When he tries to expound his philosophy as a thesis, as in *The Genealogy of Morals*, what he has to say is of very little value.

Nevertheless he has, though not a system, a "world vision," he is in the Romantic tradition, and he has a teaching about morality which is interesting and has had a great influence.

Nietzsche is most easily understood as an inverted Schopenhauer. He accepted Schopenhauer's account of the world as evil and alien to man, accepted also his unfortunate identification of Christianity with asceticism, but revolted against his pessimism and his denial of the will

to live. The behaviour which Schopenhauer praises he condemns. Asceticism and Christianity are founded on the denial of life. Courage and daring, then, are the noblest of virtues. Man's greatness consists not in obeying or in acquiescence, but in creation—and the greatest creation is the creation of moral values. Life is a continual revaluing of values, a new creating of values by the great man, who is not supported by a moral universe or by the morality of his fellows. For Nietzsche's morality is essentially aristocratic; democracy he hates. Like his Romantic predecessors (for he is essentially a Romantic) he interpreted the world by himself. Truth is got by daring, and the true view of the world is that which it takes most daring to believe. Nietzsche's views have been much perverted. They have been taken to support all these tendencies in modern German thought which he most hated. Yet it is the fault of his teaching that it lends itself so easily to perversion. He himself attacked a perversion of Christianity. Perverted Christianity is nothing to perverted Nietzschianism; for if his teaching is made into a doctrine, and the poetry taken out of it, it can be made to contain little more than that silly misunderstanding of Darwinism which has been invoked to defend violence and greed and to condemn co-operation and brotherliness. The value of his work lies not in the doctrines which it inculcates—these are neither consistent nor profound—but in its fine exploration of the possibilities of courage. We might apply to him, as to all German philosophers, words which are used by Höffding of Schopenhauer: "Every important individuality is a point of view for the human race from which men catch sight of possibilities and aspects of existence which would otherwise have escaped them."

Nietzsche broke with the great tradition of German philosophy. The long struggle between the attempt to be all-comprehensive, to form a system which would take in all the facts and yet do justice to the freedom of the spirit, has by his time broken down. The amassers of facts have

little vision, and the seer of visions no foundation for his vision but his own fiery spirit. The lifelessness of much modern German learning, and the shallowness and inconsistency of much of Nietzsche's thought, for all his extraordinary flashes of insight, makes us realise how great a thing had been the combination of system and romanticism in earlier German philosophy. We in this country are not in much danger of suffering from the defects of German philosophy. Our spirit revolts against them too easily. The saving grace of humour and the distaste for the impractical will keep us from following their guidance blindly. We are perhaps in more danger of being blind to their great qualities, their thoroughness and their daring of thought, which have made German philosophy a powerful instrument of inspiration and illumination.

III

WHAT SCIENCE OWES TO GERMAN INVESTIGATORS

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GENERAL

The aim of this chapter is to give some indication of the magnitude of the contributions which German investigators have made to Science (in the conventional sense), especially during the last hundred years. We have sought to illustrate the state of the case mainly as regards Biology, Physics, and Chemistry.[1] Of the abstract science of Mathematics, it would require genius to speak profitably in a sketch of this sort, so we have given a list of about half a hundred of the great mathematicians, classified according to nationality. As to the Applied Sciences (such as Medicine, Forestry, Engineering, and Agriculture) we have not been able to do more than give a few illustrations. Perhaps it will tend to clearness if we borrow from another inquiry a map of the sciences, and this is the more appropriate since it is characteristic of the German mind to be orderly, to have things classified and systematised. This feature may be in part a traditional inheritance from the Encyclopædists; it may also indicate a particular kind of intellectual temperament, eager to map out everything methodically (which

[1] Our indebtedness to Merz's *History of European Thought in the Nineteenth Century* (4 vols., 1896–1914) is gratefully acknowledged. We have also utilised two of our previous studies—*The Science of Life* (Blackie, 1899), and *The Progress of Science* (Chambers, 1902).

MAP OF THE SCIENCES.[1]

CLASSIFICATION ADOPTED.

ABSTRACT SCIENCES.	CONCRETE SCIENCES.			
	GENERAL.	SPECIAL. (Examples only can be given in the space.)	COMBINED.	APPLIED.
METAPHYSICS (SUPREME)	SOCIOLOGY	ETHNOLOGY STUDY OF INSTITUTIONS	SCIENCE OF HUMAN HISTORY	POLITICS CIVICS ECONOMICS
LOGIC	PSYCHOLOGY	AESTHETICS LINGUISTICS PSYCHO-PHYSICS		ETHICS EDUCATION
	GENE-OLOGY | MORPH-OLOGY | PHYSI-OLOGY | AETI-OLOGY BIOLOGY	ZOOLOGY BOTANY PROTISTOLOGY	ANTHROPOLOGY GENERAL HISTORY OF THE BIOSPHERE	EUGENICS MEDICINE FORESTRY
STATISTICAL METHODS	PHYSICS	ASTRONOMY GEODESY METEOROLOGY	GENERAL HISTORY OF THE EARTH GEOLOGY GEOGRAPHY OCEANOGRAPHY	NAVIGATION ENGINEERING ARCHITECTURE
MATHEMATICS (FUNDAMENTAL)	CHEMISTRY	SPECTROSCOPY STEREO-CHEMISTRY MINERALOGY	GENERAL HISTORY OF THE SOLAR SYSTEM	AGRICULTURE METALLURGY MINING

GERMAN CULTURE

[1] From the author's *Introduction to Science.* Home University Library. Williams & Norgate.

may or may not mean lucidly); it may also express, what many busy men recognise, that orderliness is a condition of efficiency. It is probable, in any case, that the Germans in their normal condition have the most orderly minds in Europe. In this respect Herbert Spencer may be regarded as thoroughly German, though very divergent in other ways, for instance in his ignoring of the literature of the subject he discussed. It may be regrettable, but it seems more or less true, that there is not much appetite in Britain for methodical systematisation.

Many of us have been accustomed in the past to think gratefully and to speak enthusiastically of the contributions which have been made to science by German investigators, and it is possible that the gratitude and the enthusiasm have been overdone. The aim of this chapter is to reconsider the facts of the case in a scientific mood. In so doing we have sought to avoid vague generalisations, especially of depreciation (too many of which are in currency), and to keep close to particular investigators and their achievements. We have thrown our study into historical form, so that the contributions made by various nationalities may be *in a general way* compared. We emphasize the words "in a general way," for it does not seem to us at all feasible to weigh the merits of individual investigators against one another.

Let us make a provisional comparison :—

NEWTON	LEIBNIZ.
HARVEY	A. VON HUMBOLDT.
DALTON	BUNSEN.
DARWIN	KEPLER.
GRAHAM	LIEBIG.
FARADAY	CLAUSIUS.
CLERK MAXWELL	BOLTZMANN.
KELVIN	HELMHOLTZ.
SPENCER	LOTZE.
JOULE	MAYER.
HUXLEY	HAECKEL.
HOOKER	SACHS.
LANKESTER	JOHANNES MÜLLER.

GREEN	GAUSS.
JENNER	BEHRING.
ALMROTH WRIGHT	EHRLICH.
J. J. THOMSON	KIRCHHOFF.
ROSS	KOCH.
DAVY	WEBER.
F. M. BALFOUR	ROUX.
FOSTER	LUDWIG.
LISTER	VIRCHOW.
GALTON	WEISMANN.
WILLIAM SMITH	SUESS.
GOODSIR	GEGENBAUR.
STOKES	CANTOR.
LLOYD MORGAN	WUNDT.
FITZGERALD	HERTZ.
LODGE	OHM.
BURDON-SANDERSON	DU BOIS-REYMOND.

Such parallel lists are interesting and even instructive, but too much must not be made of them. There is no agreement as to which men should be weighed against one another, as to whether we should consider the investigator's mental ability or his influence on the thought of the age, as to the values of the various discoveries, and so on. We cannot attain to this kind of comparative anthropometry. Our question here is less ambitious and probably more useful: To what discoveries and to what developments of ideas have German investigators contributed in such a way that their influence on science has been formative and lasting? We shall see that the answer must be, "*To a great many.*"

We have perhaps overloaded our survey with names and references, but this has been done in the hope of touching many threads of recollection in our readers' minds, and of lessening the risk of error in the general conclusion. We may be wrong in many an individual case, for instance, in our estimate of the part played by Goethe in the development of morphology, or of the importance of Weismann in relation to the study of heredity, but the probable error diminishes with the number of cases considered—unless, in-

deed, there is some fatal bias throughout, of which we are, of course, unconscious.

We must admit our failure to discriminate between race and nationality, and it is with nationality that we have dealt. As the difficulty applies to Britain, France, Russia, America, and so on, as well as to Germany, it is possible that the justness of the comparative impression may not be greatly affected. Perhaps the greatest difficulty is in regard to the Jewish element in the various nations, for the Jews have been extraordinarily inventive and independent, especially in certain departments, such as physiology and pathology. As we have not been able to discriminate the Jewish strain, we have probably given the various nationalities considerably more than they deserve.

Another difficulty applies especially to recent investigations, on which Time has not pronounced a verdict: the most momentous discoveries may be lying within our ken, like dry seeds whose promise and potency not even the wisest can discern. Who in 1866 would have said that one of the greatest of biological discoveries had been recently made and published in the Moravian town of Brünn? And it is curious that in the second volume of his *History of Civilisation*, published two years after *The Origin of Species*, Buckle lamented the absence in science of any recent generalisation of much magnitude!

Needless to say, we hold no pro-Teuton brief, but it seems to us that injustice has been done by some of the recent depreciations of what Science owes to German investigators. It is to be feared that old scientific friendships will never be renewed, but for the sake of generations to come, the ideal of a world-wide republic of science must not be relinquished.

Deplore as we may what Germany has done in bringing about this war and in the course of waging it, disappointed as we may be at the tragedy of what seems to us to be a terrible reversion in civilisation, we should not forget what some of Germany's sons have done for the

illumination of the world. Nor should we forget that we are not ourselves the finest Parian, or the fact that between the individual and the state a great gulf—difficult to navigate—is fixed.

For the sake of future international relations, when civilisation—after a terrible parenthesis illumined by valour—will begin, we hope, once more to develop in the direction of *positive* peace, and for the sake of our own self-respect as truth-lovers, we must withstand the temptation to belittle what has proved itself great—the work done by German investigators. If our characteristically sane sense of humour were not being (necessarily) blunted by sorrow, anxiety, and indignation, we should perceive the absurdity of depreciating the scientific greatness of the country of Behring, Boltzmann, Bunsen, Cantor, Clausius, Dedekind, Du Bois-Reymond, Ehrlich, Fischer, Frege, Gauss, Gegenbaur, Goethe, Haeckel, Helmholtz, Hering, Herschel, Hertz, Hofmann, Hofmeister, Humboldt, Keppler, Kirchhoff, Koch, Kopp, Leibniz, Liebig, Lotze, Ludwig, Mayer, Meyer, Johannes Müller, Ohm, Ostwald, Penck, Richthofen, Riemann, Ritter, Rosenbusch, Roux, Sachs, Suess, Virchow, the Webers, Weismann, Wislicenus, Wolff, Wundt, Zirkel, Zittel.

Another preliminary note seems necessary, that there are several distinct kinds of scientific discoverer. (1) There is the discoverer who finds out and justifies new methods, as **Kirchhoff** and **Bunsen** did in establishing spectroscopy, as Simpson with the use of chloroform as an anæsthetic, as Jenner did with vaccination. (2) There is the discoverer who makes new contacts between different departments of science, as **Wundt** did in bringing physiology and psychology together, as **Ostwald** has done in bringing physics and chemistry together, as Galton and Pearson have done with biometry. (3) There is the discoverer of some new instrument or practical device, such as the telescope and the compound microscope, both of which are probably to the credit of Galilei, such as the heart-beat measurer of

Ludwig or the laryngoscope of Czermak. (4) There is the discoverer who gives practical point and application to a theoretical generalisation already established, as **Hertz** did in connection with wireless telegraphy, as Lister did in proving the value of antiseptics. (5) There is the discoverer who completes a synthesis towards which many lines of investigation had been leading, as **Schwann** and **Schleiden** did in formulating the cell-theory, as Joule and **Helmholtz** did in stating the law of the conservation of energy, as Darwin did in making the evolution-idea current intellectual coin. (6) There is the discoverer who has a flash of insight which makes a whole subject new, as Darwin and Wallace did in perceiving the importance of natural selection in the struggle for existence, as Mendel did in recognising the law of the inheritance of unit characters. (7) There is, finally, the discoverer, who must by no means be denied his due, who justifies and develops some idea which has been previously suggested, but has been lost sight of, or left without a sufficient body of facts. Thus, in connection with the inter-relations of insects and flowering-plants, some of Darwin's work was a development of **Sprengel's**; and thus, in connection with heredity, some of Bateson's work has been a vindication, extension, and development of Mendel's. Merz quotes from Helmholtz a significant remark that he made in connection with the controversy over the merits of the various contributions towards the doctrine of the conservation of energy: "The best ideas run the risk of remaining barren, if not accompanied by that energy which lasts till the convincing proof of their correctness has been given."

A. BIOLOGY

We begin our survey with the central science of Biology, which stands midway between Psychology and Sociology on the one side, Chemistry and Physics on the other. It is the science of organisms; it deals with the forms of life—

their structure, their activities, their continuance, development, and evolution. Instead of dividing it into its subsciences of Botany and Zoology, Bacteriology and Protistology, and so on, we shall refer more generally to (1) the study of vital activities (Physiology), (2) the study of structure (Morphology), (3) the study of development (Embryology), and (4) the study of evolution (Aetiology), with a few illustrative references to practical applications, *e.g.* in Medicine.

To give a preliminary picture of how the nations stand, let us select four sets of twelve names prominent in the history of biological science and arrange them in parallel columns. We dare not draw any inference save that each set of twelve has made the world its debtor. There is, of course, no reason, save that of space-limits, for adhering in a Procrustean fashion to the number 12; it has the disadvantage of excluding many great names. (See page opposite.)

1. PHYSIOLOGY

PIONEERS.—In his *Lectures on the History of Physiology during the Sixteenth, Seventeenth, and Eighteenth Centuries* (1901), Sir Michael Foster deals with forty chief investigators, and of these three were of German birth—**Franciscus Sylvius** of Hanover (1614–1672), whose name is familiar in connection with "the aqueduct of Sylvius" in the brain; **G. E. Stahl** of Anspach (1660–1734), the founder of "animism" and the theory of phlogiston which lasted for a century; and **Brunner** of Dieffenheim (1653–1727), who made experiments on digestion and discovered the glands since known by his name. Three out of forty is a small number, and the fact that Germany did not contribute largely to the physiology of these three centuries is made the more emphatic when we notice that Sir Michael Foster's list includes Vesalius, Harvey, Malpighi, Descartes, Borelli, Haller, and Spallanzani—all of them very great

REPRESENTATIVE INVESTIGATORS IN BIOLOGICAL SCIENCE

BRITAIN	FRANCE	GERMANY	OTHER COUNTRIES
F. M. Balfour, 1851–1882	Claude Bernard, 1813–1878	Driesch	A. Agassiz, 1835–1910 (U.S.A.)
Bateson	Bichat, 1771–1802	Gegenbaur, 1826–1903	K. E. von Baer, 1792–1876 (Rus.)
Charles Bell, 1778–1842	Brown-Séquard, 1818–1894	Haeckel	De Vries (Hol.)
Darwin, 1809–1882	Buffon, 1707–1788	Hofmeister, 1824–1877	Hubrecht (Hol.)
Galton, 1822–1911	Cuénot	Koch, 1843–1910	Johannsen (Den.)
Harvey, 1578–1657	Cuvier, 1769–1832	Johannes Müller, 1801–1858	Kowalewsky, 1840–1901 (Rus.)
John Hunter, 1728–1793	Et. Geoffroy St. Hilaire, 1772–1844	W. Roux	Linnaeus, 1707–1778 (Sw.)
Huxley, 1825–1895	A. L. De Jussieu, 1748–1836	Sachs, 1832–1897	Mendel, 1822–1884 (Austro-Siles.)
Ray Lankester	Lacaze-Duthiers, 1821–1901	Virchow, 1821–1902	Metschnikoff (Rus.)
Karl Pearson	Lamarck, 1744–1829	Weismann, 1834–1914	Nägeli, 1817–1891 (Swz.)
Herbert Spencer, 1820–1903	Pasteur, 1822–1895	C. F. Wolff, 1733–1794	Spallanzani, 1729–1799 (Ital.)
A. R. Wallace, 1822–1913	Reaumur, 1683–1757	Zittel, 1839–1904	E. B. Wilson (U.S.A.)

names. Harvey (1578–1657) is for ever famous not only for his demonstration of the circulation of the blood and analysis of some of the factors in its flow, but because he inaugurated a new epoch of observation and experiment. Haller (1708–1777), a Swiss, had something of his scientific temper, and from his great long-lived text-book, as well as from his researches on the nervous system, we may perhaps date the coming of age of physiology as a special science. Professor W. Rutherford has spoken of Haller as giving to physiology its present aspect, and Sir Michael Foster writes: "We have gone forward so much because we have laboured on Haller's lines. He expounded the nervous system in a spirit which has become the modern spirit, and our progress has been due to our following his example."

FUNCTIONS OF ORGANS.—When we pass from the work of Haller to that of **Johannes Müller** (1801–1858), we feel at once in a new century. Chemistry and physics had made great strides, and he calls them to his aid in analysis. Yet he did not think that chemistry and physics could answer the physiologist's questions, and while he defended in his doctorial thesis the proposition: *Psychologus nemo nisi physiologus*, he was a convinced vitalist. We rank Johannes Müller as a genius, as one of the great figures in the history of biological science, and we would support our opinion by quoting that of one of the wisest of modern physiologists, Sir John Burdon-Sanderson, who writes: "Just as there was no true philosophy of living nature until Darwin, we may with almost equal truth say that physiology did not exist as a science before Johannes Müller. For although the sum of his numerous achievements in comparative anatomy and physiology, notwithstanding their extraordinary number and importance, could not be compared for merit and fruitfulness with the one discovery which furnished the key to so many riddles, he, no less than Darwin, by his influence on his successors, was the beginner of a new era." He was a man of extraordinary scientific resource and co-ordinating capacity, and

must be recognised as the founder of Comparative Physiology. On the foundations of Comparative Physiology as Müller laid them, few have built with distinction; of these few the most noteworthy are probably Metschnikoff, **Krukenberg,** Cuénot, **Verworn**, and Loeb. But the influence of Johannes Müller on general physiology and on medicine was greater.

As we think of the vast number of investigations on the functions of organs, we see that they may be grouped on three or four lines. (1) The manifoldness of the functions of certain organs has been recognised, and there is no better illustration than the work of Claude Bernard (1813–1878) on the liver, or of Minkowski and von Mering on the pancreas. (2) There has been an elucidation of enigmatical organs, as well illustrated by the work of **Schiff** and **Baumann** on the thyroid, of Marie, Schäfer, and Herring on the pituitary body. (3) There has been a fuller understanding of the correlation of organs in the life of the whole, as is splendidly illustrated by Sherrington's *Integrative Action of the Nervous System.* Another illustration is to be found in the study of internal secretions, which dates from Claude Bernard and Brown-Séquard, and has been continued with remarkable results by Pawlow, by Bayliss and Starling (who invented the word "hormones" for a particular class of internal secretions), by Schäfer, by Steinach, by Abderhalden, and many others. We may note that it was a Japanese investigator, Takamine, who succeeded in isolating the active substance of the suprarenal glands (indicated by the experiments of Schäfer and Oliver) and named it adrenalin. Its great value in stopping bleeding has been most beneficently utilised in surgery, especially along with a local anæsthetic, cocaine.

In many cases the interlinked co-operation of workers of different nationalities is very intricate, and only an investigator of the problem in question is in a position to say whose lever was most effective in getting at the truth Thus, if we take as an instance the function of the thymus

glands—one of the riddles of the body—we have to take account of the contributions of **A. von Kölliker, Stieda, His, Dohrn,** Gulland, **Maurer,** Prenant, Beard, **O. Schultze,** and many more.

From the middle of the nineteenth century onwards the study of the functions of organs has become increasingly experimental along chemical and physical lines. On the chemical side, we may mention: **Wöhler, Liebig,** Claude Bernard, **Pettenkofer, Voit, Ludwig, Pflüger, Kühne, Hoppe-Seyler,** Bunge, Halliburton, **Kossel, Heidenhain,** Lea, Moore, Macallum. On the physical side, we may mention: **Weber, Volkmann, Helmholtz, du Bois-Reymond,** Marey, **Fechner, Ludwig, Brücke, Pflüger, Engelmann,** Foster, Burdon-Sanderson, Gotch. . . . . We do not think that it is easy to exaggerate the importance of German contributions to physiological science.

PROPERTIES OF TISSUES.—The foundation-stone of the physiology of tissues was laid by Xavier Bichat in his *Anatomie Générale* published in 1801, in which the body was analysed into its component tissues—nervous, muscular, glandular, and so on—and the idea was advanced that the functions of organs might be expressed in terms of the tissues that compose them. We cannot do more than illustrate the elaboration of this idea by subsequent investigators. Thus, taking one of the two master-activities of the body, that of the nervous system, which brings the creature into sensitive relations with its environment and integrates the whole behaviour, let us notice how the investigators of different nationalities have contributed to its elucidation, to the study, in other words, of one of the most important of human problems.

In 1811 Charles Bell (1774–1842) announced (in a privately printed pamphlet!) his "New Idea" that the posterior or dorsal roots of the spinal nerves are sensory in function (conducting impulses centripetally), while the anterior or ventral roots are motor in function (conducting impulses centrifugally)—an ever memorable instance of

biological insight. For, as Sir Michael Foster has said, "our present knowledge of the nervous system is to a large extent only an exemplification and expansion of Charles Bell's 'New Idea,' and has its origin in that." Let us not forget that it was proved experimentally by **Johannes Müller,** who was also the author of the not less important new idea that different kinds of stimuli applied to the same sense-organ and nerve always evoke the same kind of sensation. Vulpian in 1866 made the needed correction that the specificity is not in the nerves themselves, for they are merely conducting paths like telegraph wires, but in the nerve-centres or ganglia with which they are associated. This opened the way for the mapping out of the brain and the spinal cord, begun by **Fritsch** and **Hitzig** in 1870, seized upon as a promiseful method by David Ferrier, and thereafter prosecuted by a crowd of brilliant experimenters —**Munk,** Beevor, Horsley, **Goltz,** Schäfer, Sherrington, Gotch, **Flechsig.** And in connection with the nervous system we may here refer to **Emil du Bois-Reymond** (1818–1896), a German patriot of French descent (a pure Celt, he said), who ranks high for his life-long study of the electrical phenomena associated with nerve and muscle. Similarly **Helmholtz** will always be remembered in connection with the physiology of the eye and the ear.

THE LIFE OF CELLS.—Below the functions of organs and the properties of tissues lies the vital activity of the component cells. If the body be likened to a city, the organs are comparable to the Town-House, the Market, the Power-Station, and so on, and the several tissues are like rows of similar shops or offices discharging similar functions. The cells are comparable to the inhabitants, and cannot be analysed into any lower order of *biological* individuality.

Now the recognition of cells as the structural and functional units of the organism was one of the great events in the history of biology. Speaking of the cell-theory, as the conclusion referred to is called, Professor E. B. Wilson of

Columbia University, one of the leading cytologists of today (and much more than cytologist) has declared: "No other biological generalisation, save only the theory of organic evolution, has brought so many apparently diverse phenomena under a common point of view, or has accomplished more for the unification of knowledge."

Let us take this, then, as a test case, and observe how German investigators have contributed. We shall quote from Principal Sir William Turner: "Without hesitation I should say that one of the greatest achievements of biology in the nineteenth century was the recognition that plants and animals are composed of cells, or, more generally expressed, of numberless very minute, elementary organisms. By the co-operation of famous biologists—I mention only Purkinje, **Schleiden** and **Schwann, Hugo von Mohl,** Nägeli, **Remak, Kölliker** and **Virchow, Brücke, Cohn** and **Max Schultze**—our knowledge of the organisation of living substance has been greatly extended and deepened. In the theory of cells and protoplasm, anatomy and physiology secured a firm foundation similar to the theory of atoms and molecules in chemistry." It is surely very striking that all but two of the contributors named by this great authority are Germans, and with each of them it is quite easy to associate some definite step.

If we pass from the general to the particular we get the same impression of the magnitude of German contributions to biological science. There are no cells more important for man to know about than nerve-cells, and here we have **Waldeyer** in 1891 formulating the important "Neuron Theory" that the body of the nerve-cell, its branching processes, its main nerve-fibre and the collateral branches thereof form a structural unit or a single cell. In this connection it is interesting to remember the important work of Augustus Waller (1816–1870) about forty years previously. In the same connection must be noted the investigations of **Wilhelm His** on the development of the nerve-cell and its outgrowths—a line of investigation

brilliantly continued by the Spaniard Ramon y Cajal (to whom, along with the Italians Golgi and Marchi and the Germans **Weigert, Ehrlich,** and **Nissl,** great improvements in methods are due). Noteworthy recent contributions to our knowledge of the development of the nerve-cell have come from Carrel and Harrison in America. But as we think of nerve-cells, many other names come thronging through the mind—**Kölliker, Remak,** Retzius, Lenhossek, van Gehuchten, Ranvier, **Biedermann** and Hodge.

Returning for a moment to a more general outlook, we venture to say that if an impartial assembly of biologists with physiological interests had been asked in July 1914 to name the man who had done most of recent years to expound and demonstrate the importance of cellular physiology, the answer would have been **Max Verworn.**

THE PROBLEM OF CELL-DIVISION.—One of the great unsolved problems of Biology is as to the conditions that bring about cell-division. There is a wealth of detailed information as to the process of cell-division in its various modes, but we do not know what sort of internal instability brings it about. Herbert Spencer, **Leuckart** and Dr. Alexander James appear to have independently suggested that in the growth of a typical cell the increase of volume soon outruns the increase of surface, and that the division of the cell into two restores the normal proportion. But this shows why cell-division is profitable, not what makes it occur. **Richard Hertwig** has laid great emphasis on the relation between the nucleus and the amount of cytoplasm which it can effectively control (to use a vague word), but this again is a suggestion of the reason for cell-division being the rule in organic growth rather than a discovery of the operative factors. The difficult problem, which takes us near to the fundamental characteristics of living matter, has been attacked by Marcus Hartog of Cork, Gallardo, **Rhumbler,** Assheton, and others. It remains an unsolved problem.

METABOLISM.—Below the study of the activities of the

cells, which have a good deal of individuality about them, there is the study of the chemical processes of waste and repair, of disruption and construction, summed up in the term metabolism. De Blainville spoke of "a twofold internal movement of composition and decomposition," and Claude Bernard of "disassimilating combustion and assimilating synthesis"; **Hering** at Prag and Gaskell at Cambridge contributed notably to the defining of the two closely-interwoven processes of down-breaking and upbuilding, of katabolism and anabolism. On this line we may rank the distinguished work of **Pflüger, Hoppe-Seyler** (1825–1895), **Kossel, Krukenberg, Fischer, Verworn, Reinke, Rodewald,** Abderhalden, **Buchner,** Czapek. Our impression is that German investigators have led the way in this kind of investigation.

There are many names connected with the study of fermentation, but one of the most important within recent years is that of **Buchner,** who in 1897 did away with the time-honoured distinction between organised and unorganised ferments. It had been the custom to distinguish the fermenting work of living organisms like yeasts and bacteria from the fermenting work of non-living secretions, such as pepsin and diastase, but the distinction, quite useful in its way, was pressed too hard. What Buchner did was to grind yeast-cells in siliceous earth (diatom deposits) and squeeze out a fluid in which there were no living cells, but which could bring about alcoholic fermentation none the less. The same sort of experiment has been improved upon since, *e.g.* by Macfadyen, Morris and Rowland, with very valuable results, but we must not forget the man who took the step.

PHYSIOLOGY OF PLANTS.—The first large foundation-stone of plant-physiology was the *Vegetable Statics* (1727) of Stephen Hales (1677–1761), "in whom," Sachs says, "we see once more the genius of discovery and the sound, original reasoning powers of the great explorers of nature in Newton's age." His work was continued by Priestley

(1733–1804), Ingen-Houss (1733–1799), Senebier (1742–1809), Theodore de Saussure (1767–1845), **Liebig**, and Boussingault—all of whom contributed notably to our understanding of the nutrition of plants.

On another line we find that Hales found a successor in Andrew Knight (1758–1838), who experimented on the movements of plants, and was followed by Dutrochet. In 1827, while a student, **von Mohl** published an essay on tendrils and climbing plants, "the best," Sachs said, "that appeared on the subject before Darwin wrote upon it in 1865"; and in 1848 **Brücke** made a notable research on the sensitive plant. It is interesting that Charles Darwin's work on this line should have been so ably continued by his son, Professor Francis Darwin. Much progress has also rewarded the researches of **Haberlandt, Pfeffer, Frank.**

It sometimes happens that one man's work raises the dignity of an entire science, and we think that this should be said of the influence exerted on Botany by **Julius von Sachs** (1832–1897). Great alike as teacher and investigator, he made a science of plant-physiology. His researches on growth and development, on the relations of the plant to external stimuli, and on the everyday functions were very important, and his invention of new methods not less so. His *History of Botany* is marked by its philosophical perspective, its fine style, and its enthusiastic appreciation of discoverers of all nations.

CONTINUANCE OF THE RACE.—Although Britain has long been famous for its stock-breeding, there has been little systematic study of sex and reproduction till within recent years. Apart from Encyclopædia articles, there was not for many years, outside of Germany, any counterpart of **Hensen's** *Physiologie der Zeugung*. Darwin had, of course, paid great attention to Sexual Selection, and there had been much discussion of this theory, but there were few (if any) general surveys in English or French before *The Evolution of Sex*, by Geddes and Thomson, in 1889. Now we have Marshall's *Physiology of Reproduction*—a comprehensive

treatise of great merit. The work of Giard and Delage on the remarkable effects which are brought about in crabs by the parasitism of Sacculina and similar forms has been followed up and extended by Geoffrey Smith and Potts, and has thrown much light on some of the problems of sex. Smith's studies in the experimental analysis of sex are fundamental contributions to the subject. To Steinach in particular we owe the elucidation of the rôle of internal secretions in evoking the development of secondary sex-characters—an idea which was probably first developed by Brown-Sequard —and here should also be mentioned the work of Tandler, Grosz, Kammerer, and Bucura.

To American cytologists, in particular (Wilson, M'Clung, T. H. Morgan, Stevens, Sutton), is due the discovery of the accessory chromosome and its probable significance as a sex-determinant. The study of sex as a Mendelian character and of sex-linked characters is especially associated with Bateson, Castle, **Correns,** Doncaster, T. H. Morgan, and Punnett. The important work of Maupas on the reproduction of Infusorians has been continued with fine results by Calkins, Jennings, Joukowsky, and Woodruff.

THE WEB OF LIFE.—We have been referring to the physiology of the individual organism, but there is a "higher physiology" of organisms in their relations to one another and to their environment. This is sometimes called ecology or bionomics, and a single illustration may be given. One of the most valuable contributions that the naturalist has made to the general thinking of educated men is the concept of "the web of life," the correlation of organisms, the interrelatedness of things in nature. Nothing lives or dies to itself, nothing is isolated; nature is a vast system of interrelations. Earthworms have made most of the fertile soil of the earth; cats have to do with next year's clover crop; eighty seeds may germinate from one clodlet on one bird's foot. These are Darwinian instances, and all the world admits that Darwin more than any naturalist before or since realised "the significance of the linkages which join

life to life." It is very interesting, however, to recall a remarkable pioneer—all but forgotten till Darwin remembered him. That was **Christian Konrad Sprengel** (1750–1816), Brandenburger and Berliner, who published in 1793 *The Secret of Nature discovered in the Structure and Fertilisation of Flowers*, in which he showed the mutual adaptations of flowers and insects in a manner which Darwin described as being "full of truth," although "with some little nonsense." Humboldt was another of the pre-Darwinians who had the vision of the web of life, and it is pleasant to recall that he also had his influence on Darwin.

Before leaving Sprengel we may call attention to the fact that, although his work was ignored by his contemporaries, Germany gave him his reward in the long run, for there have been many notable German workers in the field centred in the fertilisation of flowers. **Hermann Müller** must be ranked along with Delpino, **Hildebrand**, and Kerner.

NATURALIST TRAVELLERS.—There are a good many well-known names on the chronological list before we come to the first great German, and that is probably due to the long-restricted sea-board. We recall Marco Polo of Venice, Edward Wotton (*d.* 1555), the Swiss Gesner (*d.* 1565), the Italian Aldrovandi (*d.* 1605), the Scotsman Johnson (*d.* 1675), the Frenchman Belon, Thomas Pennant; and then we come upon two famous Germans, **Peter Simon Pallas** (1741–1811) and **Alexander von Humboldt** (1769–1859).

Pallas is memorable for his zoological exploration of Russia and Siberia (and many people know of the occasional incursions of Pallas's Sand-Grouse into Britain), for the width of his competent knowledge (zoloogy, ethnology, geology, &c.), and for his shrewd questionings in regard to geographical distribution, the influence of climate, the variations of animals, and similar topics. Alexander von Humboldt was one of the greatest (and one of the last) of the all-round naturalists. He was one of the beginners of the scientific study of the geographical distribution of

plants and animals—pointing on to Alfred Russel Wallace and his successors. The author of *Cosmos* is to be for ever held in admiration as a truly magnificent type of the naturalist-traveller, observant, widely interested, reflective, reaching forward to Darwin in the success with which he realised the complexity of the inter-relations in nature.

The Columbus-voyage of Biology was Darwin's voyage on the *Beagle*, for it discovered a new world, and the journeyings of his magnanimous fellow-worker, Alfred Russel Wallace, shared in this glory. We go on to think of Bates and Belt, with whom we may place the German naturalist, **A. E. Brehm** (1829–1884), whose *Tierleben* has had a great influence in broadening Natural History, and **Fritz Müller**, whose *Für Darwin* was a notable contribution in its day. In the *Challenger* expedition, associated especially with the names of Sir Wyville Thomson and Sir John Murray, Britain took the lead in the scientific exploration of the sea, and of the deep sea in particular, but many countries have followed that up with enthusiasm, and there is no picking and choosing between the results of the great explorations which have gone forth from France and Germany and Holland, from Norway and America and Monaco.

The particular type of reflective naturalist-traveller interested in biological problems at least as much as in discovering new organisms, was for a time very distinctively British, which we attribute largely to the greater facilities for travelling. Since the time of **Semper**, whose *Animal Life* is a masterpiece, this type has been excellently represented in Germany.

VITALISM.—Many different positions are included within the term "vitalism," but if we use it in a wide sense to mean the doctrine that the concepts and formulæ of physics and chemistry do not suffice for the adequate description of the activities of organisms (in growth, development, behaviour, and variation), then we may record as vitalists a few German investigators such as **Johannes Müller, Liebig, Wöhler, Roux, Rindfleisch,** and **Reinke.** But they

seem to be in a small minority. On the other hand, the most carefully and consistently thought-out doctrine of positive vitalism, advancing to a constructive theory of Entelechy, will be found in the Gifford Lectures delivered in Aberdeen by **Hans Driesch.**

BIO-PSYCHOLOGY.—However we may interpret what is called the relation between body and mind, we must allow that biology and psychology join hands in the study of animal behaviour. Psychology is pre-eminently the science of mental processes, but these are correlated with brain-processes, and these with the life of the organism as a whole. The mental processes cannot be explained or re-described as special complications of processes that are not mental, but there is a correlation or concomitance or unity which cannot be ignored, however it may be interpreted. Let us recall the names of some of those who have worked at the problem of " the correlation of mind and body." Perhaps the two best books on the subject are British and German—MacDougall's *Body and Mind* and **Busse's** *Körper und Geist.* The Germans have the credit of **Gall** (1758–1828) and **Spurzheim** (1776–1832), who founded phrenology, doubtless an erroneous system, but of service notwithstanding. A great step was taken in 1811 when Charles Bell discovered the distinction between motor and sensory nerves, corroborated by **Johannes Müller** and Magendie, and another in 1832 when Marshall Hall elucidated the phenomenon of reflex action, and another in 1861 when Broca (1824–1880), following the pioneer work of Flourens and Boillard, discovered the centre of speech in the cerebral hemispheres. That led on to the work of cerebral localisation in the hands of men like **Fritsch, Hitzig,** Ferrier, Hughlings Jackson, Franck, Pitres, **Munk, Goltz,** Horsley, Gowers, Schäfer, **Flechsig,** Schrader, Steiner, Marie. It seems likely, as Loeb and others have indicated, that the idea of " brain-centres " has been pushed too far, but it has been of great service, and Germany has done its share.

EXPERIMENTAL PSYCHOLOGY.—It is easy enough to make vague, depreciatory statements, as some eminent authorities have done, regarding the contributions of German investigators to science, but the advantage of taking a scientific survey of the facts, as we have tried to do, is to disclose fields in which the German contributions stand out pre-eminently. One of these fields is Experimental Psychology. Most of the work dates from 1878, when **Wundt** opened his laboratory of physiological psychology at Leipzig, and most of the present-day investigators along this line have admitted their indebtedness to this master.

Before Wundt, there was pioneer work of importance. Thus **Johannes Müller** (1801–1858), who adorned whatever he touched, established the law of the "specific energy of the senses"—that the same stimulus acting on different sense-organs produces different kinds of sensations, while different kinds of stimuli acting on the same sense-organ produce the same kind of sensation. Of this law Bunge says that it is "the greatest and deepest truth ever thought out by the human intellect," and Helmholtz, with equal hyperbole, compared it to the law of gravitation. It has been criticised by Lewes, Wundt, and others. Another pioneer was **Ernst H. Weber** (1795–1878), who, helped by his gifted brothers Wilhelm and Eduard, introduced precise methods into bio-psychology and tried to discover the relation between intensity of sense-stimuli, objectively measured, and the intensity of the associated sensation. Nor can we forget the investigations of **Helmholtz** on sight and hearing, and his measurement of the velocity of nerve-messages (1851)—a very important step; or of **Fechner** (1801–1887), who devoted much attention to Weber's Law (as he called it), and was the first to speak of Psycho-physics. Beside Herbert Spencer's *Principles of Psychology* (1855) should be ranked **Lotze's** *Medicinische Psychologie, oder Physiologie der Seele.* Among those who have worked along lines similar in a general way to those which Wundt has followed we may note: Herbart (1776–1841), Benecke

(1798–1854), **Bethe, Ebbinghaus,** Ribot, James, Pierre Janet, **Kraepelin,** Ladd, Lipps, Loeb, **Münsterberg,** Titchener.

COMPARATIVE PSYCHOLOGY.—Another line of research is that of comparative psychology, as illustrated, for instance, in the study of instinctive behaviour at various levels of organisation. We recall the names of many investigators and thinkers: **Bethe,** Bohn, **Büchner,** Samuel Butler, Darwin, Forel, **Groos,** G. H. Lewes, Loeb, Wesley Mills, Lloyd Morgan, J. J. Murphy, Romanes, **Schneider,** Spalding, Spencer, Thorndike, **Uexküll,** Vogt, Wallace, **Wasmann, Weismann,** C. O. Whitman, **Ziegler.** It seems fair to recognise Romanes (1848–1894) as having done much to put Comparative Psychology on a sound basis, and Britain has, of course, good reason to be proud of the experimental work of Lloyd Morgan and of the construction which he has based upon it, but, on the whole, we cannot recognise here what seemed plain in connection with Experimental Psychology, that the work emanating from any one nationality is pre-eminent. The bio-psychological inquiries on the behaviour of Protozoa made by **Verworn** in Bonn, and by Binet in Paris, were very interesting, but Jennings, at Johns Hopkins, has long since gone much farther. The ingenious and keenly-critical work of Jacques Loeb in America is of the first rank, though dogmatically mechanistic, but that of Georges Bohn in France is just as fine. A fine study like that of **Groos** on the play of animals may be balanced by that of Espinas on animal societies, or Freud's study of dreams by Bergson's. We associate the genetic study of psychology with the work of Herbert Spencer, Darwin, Mark Baldwin, Stanley Hall, Freud, and others, but we must remember the notable beginning of careful child-study which **Preyer** made long ago in Jena. What interpretation is to be given to the alleged arithmetical feats of the thinking horses of Elberfeld remains uncertain.

2. MORPHOLOGY

Just as physiology is the study of functions and habits, so morphology is the study of organic form and structure. In both cases there has been a gradually deepening analysis of the organism and its vital activities, a penetration from the creature as a whole to the organs, the tissues, the cells, and the living matter itself. But the morphologist has to do with more than structural analysis; he has to find unity amid manifoldness, to disclose the styles and principles of organic architecture, to provide the basis for a rational, that is, genetic, classification.

FOUNDATIONS.—The founders of modern morphology appear to us to have been Cuvier and **Goethe.** To Cuvier (1769–1832) the science owes not only a broad basis of comparative anatomy, but the idea of utilising this in classification, an insistence on the correlation of parts (the creature being always a consistent unity), and an appreciation of the significance of fossils. To **Goethe,** poet-naturalist though he was, the debt is perhaps even greater, simply because of the clearness with which he discerned and proclaimed the fundamental morphological idea of unity underlying diversity. In 1790 he published a famous essay in which he showed for flowering plants the fundamental unity of foliar and floral organs. Many had worked towards this idea—**Joachim Jung** (1678), Linnæus (1760, 1763), the embryologist **C. F. Wolff,** and others—but Goethe expressed it in generalised form. There is, however, considerable difference of opinion as to the value of Goethe's theory. That it has been re-edited in recent times is almost immaterial, for it was the morphological idea in general that was important. In the same way, although his theory of the skull as made up of a number of modified vertebræ (as **Oken** had also suggested) was demolished by **Reichert, Ratke, Gegenbaur,** and Huxley, it was a flash of morphological genius, and to many it will not seem such a great

matter that we should now speak of the segmentation of the head, whereas Goethe thought of the segmentation of the skull. We are tempted to speak of his reflections on individuality, correlation, division of labour, and the like, but it may be more illustrative of his temper to refer to his discovery of a small bone in front of the upper jaw in man. Writing to Herder he said: "I must hasten to tell you of a piece of good fortune that has happened to me. I have found—neither gold nor silver, but what gives me inexpressible delight—the intermaxillary bone in man." It had been supposed that man was distinctive in having no such bone, and what so much delighted Goethe was the confirmation of the all-pervading unity of structure between man and other mammals. The discovery was made independently by Oken, but the same must be said of Vicq d'Azyr who was also marked by shrewd morphological insight.

GREAT COMPARATIVE ANATOMISTS.—The foundations of comparative anatomy were laid by Cuvier. But the historical succession shows the influence of another strain, that of the evolutionary anatomists, like **Goethe** and Étienne Geoffroy St. Hilaire. From these, as well as from Cuvier, there is, through **Blumenbach, Meckel,** Camper, John Hunter and others, with Owen as a transition-type, an affiliation with more modern comparative anatomists like **Gegenbaur** (1826–1903), Lacaze-Duthiers, Huxley, W. K. Parker, Lankester, Cope. Starting again from Goethe, there has been an evolution of botanical comparative anatomists, the two Jussieus and A. Pyrame de Candolle in France; **Schleiden, Alex. Braun, Hofmeister, De Bary,** and **Sachs,** and onwards to van Tieghem, **Schwendener, Goebel,** and many others of all nations.

MORPHOLOGICAL IDEAS.—The achievements of the comparative anatomists are too technical for discussion here, but we may refer briefly to some general morphological ideas. With Cuvier we may associate the idea of the correlation of organs (which he greatly exaggerated), that

the organism is a unified integrate, within which certain kinds of structures, and not others, are compatible. With Owen we may associate the defining of the distinction between the resemblance of two or more structures in fundamental architecture and development (*homology*) and a resemblance in function (*analogy*). This was elaborated by L. Agassiz and **Bronn, Haeckel** and Mivart; and Sir Ray Lankester added (in 1870) the important category of *homoplasty* or *convergence* for that close agreement in form which unrelated organisms may exhibit owing to their being similarly adapted to similar conditions of life. To Spencer credit must be given for his clear analysis of the meaning of many everyday conceptions, such as differentiation and integration. To **Dohrn** we owe the fertile idea that an apparently novel structure seems often to have arisen in the course of evolution from an old structure, with an associated change of function. To Dohrn and to Lankester we also owe a useful insistence on the occurrence of retrogressive changes (or degeneration) in the course of evolution, which is certainly by no means always on an onward and upward line. To Kleinenberg is due the subtle idea of the substitution of organs, which may be illustrated by the way in which the old-fashioned endodermic axis or notochord prepares the way for, and usually gives place to, its mesodermic substitute—the backbone. We venture to say that no one who has read **Haeckel's** *Generelle Morphologie* (1866) will be inclined to maintain that Germany has not contributed her share to the by no means large stock of general morphological ideas.

SCIENCE OF SHAPES.—On the tomb of the anatomist Goodsir there is graven a logarithmic spiral, such as one sees so often in organisms, in shell and horn, in bud and cone. It is indeed of such frequent occurrence that Goodsir believed that a careful study of it would lead to the discovery of some principle or law of growth. Several thinkers have been on the same track—Leonardo da Vinci, Sir John Leslie, Canon Moseley, the botanist A. H. Church, and

recently Mr. J. Th. Cook, who has made a careful and ingenious study of spirals in nature and in art. There are two distinct questions—(1) What may be the utility, or survival value, of this spiral form which has such abundant outcrop in nature? and (2) What physical forces of surface-tension, pressure, cohesion, and the like are operative in moulding organic form? This is an important study—a sort of borderland between biology and physics—to which little attention has been paid in this country, though the subject has been illumined in several studies by Prof. D'Arcy W. Thompson. We wish to point out that as early as 1866 **Ernst Haeckel** gave it special attention under the title Pro-morphology.

THE MICROSCOPE.—Harvey made his observations on the developing chick, for instance, with the aid of a simple lens; and it is an eloquent testimony to his powers of observation that he saw as much as he did. But the invention of the compound microscope opened up a new world. It was not merely that everything could now be seen magnified several hundred times, which might have made as little difference to science as doubling everyone's income would make in economics; the important gain was the disclosure of agents and operations previously quite unknown. We need not mention more than a few examples—protozoa, yeast-plants, bacteria, spermatozoa, phagocytes, nerve-endings, cell-division, and the process of secretion. The invention of the compound microscope has been claimed for Galileo (about 1610), Hans and Zacharias Janssen (between 1590 and 1609), Drebbel (1621), and Fontana (1618). Among the early microscopists of note were Leeuwenhoek, Malpighi, Hooke, Grewe.

COMPARATIVE HISTOLOGY.—It is a commonplace now, but it was a great step that Bichat took in 1801 when he showed that the organs with which the comparative anatomist was wont to deal may be analysed into component tissues—muscular, nervous, glandular, and so on. Bichat's foundation was but slowly utilised, for although detailed

observations on tissues and cells accumulated rapidly after 1838, there was no broad comparative treatment of importance until **Leydig** published his remarkable *Comparative Histology* in 1857. So far as we know, the best comparative presentations of histological analysis are still to be found in the German successors of Leydig's text-book—for instance, in **Oppel's** co-operative treatise.

THE CELL THEORY.—There were various approximations to the "Cell Theory"—and it may be of interest to mention **Wolff** (1759), **Mirbel,** von Baer (1828, a remarkable prophetic statement), Turpin (1826), Meyen (1830), Raspail (1831), Robert Brown (1835), **Johannes Müller**, 1835, Dutrochet (1837), Dujardin, Purkinje, **von Mohl,** Valentin, **Unger,** Nägeli, **Hofmeister, Henle.** Thus gradually was the way paved for the formulation of the "Cell Theory," or better, "Cell Doctrine" in 1838–1839, by **Schwann** (1810–1882), and **Schleiden** (1804–1881)—one of the greatest steps in the development of biological science. Louis Agassiz, not being an evolutionist, spoke of it as "the greatest discovery in the natural sciences in modern times." Professor E. B. Wilson, one of those who have most successfully contributed to its development, says, "It must be placed beside the evolution-theory as one of the foundation-stones of modern biology." Our present point is that its statement and early development was mainly due to German investigators.

In 1838 Schleiden showed that plants were built up of cells and transformations of cells, and discovered the origin of the plant-embryo to be an egg-cell or ovum. In 1839 Schwann extended these two observations to animals, and thus the Cell Theory was formulated. It implies the following propositions: (1) All plants and animals have a cellular structure, being either single cells (Protozoa, Protophytes, and Protists) or built up of integrates of cells and modifications of cells; (2) every multicellular organism, reproduced in the ordinary way, begins its life as a single cell (the fertilised ovum), which divides and re-divides to build up a

body; and (3) the functions of a multicellular organism are expressible in part in terms of the activities of its component cells. In the last connection great importance must be attached to the work of Goodsir (1845) and **Virchow** (1858), who showed that in normal and pathological conditions alike the life of the whole may be spelt out in the activities of the component cells. Among those who were quick to apply the Cell Theory in the study of development may be mentioned **Reichert, Henle, Remak** and **Kölliker.** To take the last-mentioned, whom we deliberately include as German, although he happened to be born in Zurich, it seems quite impossible not to admit the magnitude of his work, both qualitatively and quantitatively. As we have said elsewhere: "he helped in establishing the cell theory, he traced the origin of tissues from the segmenting ovum through the developing embryo, he demonstrated the continuity between nerve-fibres and nerve-cells of vertebrates (1845), he isolated the elements of smooth muscle (1848), he did lasting work in connection with the development of the skull and the backbone (1849–1850), and much more, all in the early years of his scientific activity. From 1850 till the end of the century hardly a year went past without some important histological, embryological, or anatomical work from Von Kölliker, as may be readily verified by turning up the famous *Zeitschrift für wissenschaftliche Zoologie,* which he founded in 1848 along with **Von Siebold.**" [1]

The question may be fairly raised, however, whether the Cell Theory, for which we have been claiming so much, is really quite sound. The answer should be, we think, that all these generalisations must develop with the growth of knowledge. Thus it must be recognised that the cells of the body are integrated elements of a unified whole, which is somehow more than the sum of its parts; that, as the late Professor Adam Sedgwick was wont to emphasize, some embryos remain for a considerable time in the state of protoplasmic masses or syncytia with many nuclei but no

[1] *Science of Life*, Blackie, 1899, p. 104.

cell-boundaries; that the growth of the mass of living matter is the primary fact, to which the cell-divisions adapt themselves—as was conclusively shown by **Hofmeister, De Bary,** and **Sachs.** Yet it seems certain that the Cell Theory, not as a dogma, but as a living doctrine, has done more for Biology than any other generalisation, save that of Evolution.

PROTOPLASM.—In regard to the Cell Theory it may be said that we are forgetting our fellow-countryman, Robert Hooke, to whom the very word "cell," as a biological term, is due. But the idea he reached from his study of cork and wood was that of minute boxes without contents, the walls being therefore regarded as the vital parts. Even Schwann and Schleiden were not free from the error of attaching more importance to the walls of the box than to what these inclosed, and the full import of the cell theory was not clearly seen until 1861, when another German, **Max Schultze,** riveted attention on the living matter itself. Many investigators had been working towards this along various lines. Thus in 1835 a French zoologist, Felix Dujardin, had studied the living matter which streams from within the shells of Foraminifera, or chalk-forming animalcules, and had called it "sarcode," thinking it to be simpler than the formative material of higher organisms; **Purkinje** in 1839 compared the substance of the animal embryo, to which he gave the name "protoplasm," with the "cambium" of plant-cells; in 1846 **Hugo Von Mohl** described the viscid cell-substance in plant-cells and used the word protoplasm to denote it and the nucleus as well; in 1849 **Ecker** compared the contractile substance of muscles with the living matter of Amoebæ; Donders also referred the contractility from the walls to the contents; **Cohn** of Breslau suspected that the "sarcode" of animals and the "protoplasm" of plants must be "in the highest degree analogous substances." Finally, in 1861, Max Schultze formulated the growing conviction that "sarcode," "protoplasm," and the like were different terms for the living substance that forms more or

less of every cell—the " physical basis of life " in Huxley's phrase. To show how far this is from being any personal reading of history, with a bias of gratitude to German Universities, let us quote a paragraph from Professor E. B. Wilson's great book on the cell: " The full physiological significance of protoplasm, its identity with the ' sarcode ' of the unicellular forms, and its essential similarity in plants and animals, was first clearly placed in evidence through the classical works of **Max Schultze** and **De Bary**, beside which should be placed the earlier works of Dujardin, **Unger, Nägeli** and **Mohl**, and that of **Cohn**, Huxley, **Virchow, Leydig, Brücke, Kühne**, and Beale." It was a unifying conclusion of the first importance and did not German investigators contribute *largely* to its establishment ?

More Recent Work.—The cell that seemed so simple at first has become a complicated microcosm. Within its wall or membrane is the cytoplasm with an intricate organisation, and including " chromidia," " plastosomes," and other definite structures; the nucleus is another little world with its chromatin beads on bands of linin, its achromatin, its nucleoli, and much more; even the centrosomes which play an important part in cell-division are the centres of other complications. This organisation, which is beginning to be understood, has been made clear to us by a multitude of investigators, criticising one another, confirming one another, in any case making towards a secure knowledge which will be of great value both theoretically and practically. It is difficult to select names, but one recalls the work of **Auerbach, Boveri, Bütschli,** Carnoy, **Flemming,** Fol, Guignard, **O. & R. Hertwig, Strasburger,** Van Beneden.

If we take the structure of the cytoplasm, as a problem by itself, we find some investigators, like **Frommann** and **Arnold**, describing an intricate network; others, like **Flemming**, a tangled skein of fibrils; others, like **Altmann**, a crowd of granules in a gelatinous matrix; others, like **Bütschli**, a fine alveolar or vacuolar appearance like that

of an emulsion. Perhaps it was **Brücke** in 1861 who first began to realise the significant complexity of the cell-substance, pointing on in his theory of "Elementarorganismen," between the cell and the molecule, to the important modern discovery of specific "plastosomes" (they get many other names) which are associated with particular differentiations or definite functions within the cell. Of great importance also were the studies of **Quincke** on the physical properties of protoplasm.

One would like to be able to refer to Professor Patrick Geddes's luminous conception of the cell-cycle; to the demonstration of specificity in the similar cells of different animals, an epithelial cell from the windpipe of a horse being distinguishable from a similar unit from a dog; to the suggestive unity amid manifoldness that obtains in the ordinary forms of nuclear division or karyokinesis throughout the realm of organisms; to the interesting fact that each organism has a definite number of chromosomes in the nuclei of all the cells of the body: thus man, the mouse, and the lily have twenty-four; and to a score of other developments of the Cell Theory. We can but say that German investigators have done their full share in the advancement of Cytology. A brief reference must be made to micro-organisms in the wide sense.

MINUTE ORGANISMS.—In his *Ansichten der Natur*, and again in his *Cosmos*, Alexander von Humboldt spoke of the impressive ubiquity of life—of the "Allbelebtheit" of land and sea. Organisms penetrate everywhere—above the snow-line and down into the great oceanic "deeps" in which Mount Everest would be lost to view. For one organism that is seen there may be a hundred unseen, or even more than that if we take microscopic organisms into account. We may associate with Pasteur in particular the evidence of the ubiquity of Bacteria and an appreciation of the manifold ways in which they insinuate themselves into the bundle of life. In a similar connection, but with reference to the Protozoa, we may justly remember **Chr.**

G. Ehrenberg (1795–1876), a renowned microscopist, who did much to disclose both the abundance and the practical importance of these smallest and simplest of animals. Germany has been peculiarly rich, it seems to us, in investigators of the Protozoa; we think at once of **Haeckel** and his great monograph on Radiolarians, of **Bütschli's** life-long work, of **R. Hertwig** at Munich, and of **Schaudinn**, who was one of the first to demonstrate the degree to which Protozoa are responsible for disease (*e.g.* Sleeping Sickness, Syphilis). The Malaria organism was discovered in 1880 by a French investigator, Laveran. In connection with bacteriology, the names of Pasteur and **De Bary, Cohn,** and **Koch** (1843–1910), Duclaux and Roux, Haffkine, and a score of others at once rise in the mind.

CLASSIFICATION OF ANIMALS.—One of the ends of morphology is to work out a natural classification which should also be to some extent a system of pedigrees. It may be said that while there have been many careful classifiers, there have been few great taxonomists, few who have detected unsuspected affinities or have established order within a whole group. John Ray (1628–1705), whom Sir Ray Lankester calls "the father of modern zoology," was undoubtedly great in so far as he laid emphasis on anatomical characteristics as a basis of classification; Linnæus (1707–1778) was still greater; Lamarck made some progress in setting backboneless animals in order; Cuvier emphasized the anatomical basis and utilised fossil forms; Von Baer (1792–1876) was one of the first to see clearly that embryological results gave a clue to relationships, and Johannes Müller (1801–1858) applied the same idea to Invertebrates.

The mark of greatness is seen in Kowalewsky's recognition of the affinities between Ascidians and Lancelets (1866); in Vaughan Thompson's discovery of the Crustacean character of barnacles; in W. K. Parker's comparative studies on the development of the skull; in much of Huxley's work, *e.g.* the division of Vertebrates into Ichthyopsida,

Sauropsida, and Mammals; in some of Cope's studies on extinct Reptiles. To Sir Ray Lankester modern zoological taxonomy probably owes more than to any other investigator.

CLASSIFICATION OF PLANTS.—The ideal of the classification of organisms is a "natural system," based on significant resemblances, which may be detected by anatomical, embryological, or palæontological investigations. As regards plants, this idea had been present to Cæsalpinius and had found partial expression in the *Systema Naturæ* of Linnæus. Outstanding among many workers stand the figures of Laurent de Jussieu (1774–1836) and A. Pyramme de Candolle (1778–1841). Robert Brown was one of the first to show how embryological investigation comes as an aid to anatomy, and we owe to him in the main such important steps as the distinguishing of Angiosperms and Gymnosperms. But on this path the epoch-making discoveries were those of **Hofmeister** (1849, 1851), "magnificent beyond all that has been achieved before or since in the domain of descriptive botany" (Sachs), changing the whole idea of plant-development, disclosing the alternation of generations that is the clue to the genetic affinities of Cryptogams and Phanerogams. In this connection Sachs writes: "That which Haeckel, after the appearance of Darwin's book, called the phylogenetic method, Hofmeister had long before actually carried out, and with magnificent success. When Darwin's theory was given to the world eight years after Hofmeister's investigations, the relations of affinity between the great divisions of the vegetable kingdom were so well established and so patent, that the theory of descent had only to accept what genetic morphology had actually brought to view." Among those who have followed Hofmeister's lead may be mentioned **Pringsheim, Nägeli, De Bary,** Thuret, Bornet, and the greatest of these was De Bary (1831–1888). We are proud in Britain of the work of Sir J. D. Hooker (1817–1911); perhaps that of **Engler** may be named as its parallel in Germany.

PALÆONTOLOGY.—It is the task of palæontology to spell out the history of the past so far as that can be deciphered in the graveyards of the fossil-bearing rocks, to trace the rise and fall of plant and animal races, and to disclose the sublime spectacle of life's progress. Who have been the great palæontologists ?

Apart from anticipatory flashes on the part of Leonardo da Vinci, Bernard Palissy, Steno, Martin Lister, and a few others who recognised the significance of fossils, Palæontology cannot be said to have begun before the beginning of the nineteenth century, when Cuvier worked at Tertiary mammals, Lamarck at molluscs, Brongniart at plants, and William Smith at the bearing of fossils on stratigraphical problems.

In the first half of the nineteenth century the doctrines of the Cuvierian school were dominant ; many important fossils were unearthed and carefully described, but not with the evolutionist's eye. The work of Owen (1804–1893), Louis Agassiz (1807–1873), and **Bronn** was in some respects transitional, for they had the idea of a progressive succession. Thus we find that Agassiz dwells on the parallelism between the embryonic development of recent fishes and the geological series, and suggests the recapitulation idea that the history of the individual epitomises that of the race—an idea with which he may have been inspired by **Oken** at Heidelberg or by **Döllinger** at Munich. The dawn of evolutionary palæontology practically dates from Darwin's *Origin of Species* (1859), and many beautiful phylogenetic series have been worked out, *e.g.* of extinct Cephalopods, by Hyatt, Würtenberger, Branco and others. As a discoverer of interesting fossils Marsh played an important part. Huxley dealt critically with the palæontological "evidences of evolution," and his " American Addresses " had a great influence. Cope (1840–1879) is notable for his numerous brilliant and sometimes impetuous generalisations, and it seems fair to say that America stands very high for its contributions to palæontology. Gaudry's *Enchaine-*

ments du Monde animal dans les temps géologiques (1878–1896) was an achievement in its presentation of the long succession of faunas. **Neumayr**, Waagen, **Solms-Laubach**, Osborn, and others should be mentioned, but it seems just to single out **von Zittel** (1839–1904), and that not only because of his investigations and the marvellous text-book over which he spent so many years, but because of his remarkable influence as a teacher.

CONCLUSION.—When we think of the work of men like Goethe, C. F. Wolff, Meckel, Döllinger, Alexander Braun, Bronn, Johannes Müller, Haeckel, Gegenbaur, Dohrn, Kölliker, De Bary, Hofmeister, Sachs, Goebel, and the histologists, we must admit that German morphologists rank high.

3. EMBRYOLOGY

FOUNDATIONS.—Embryology, or the science of the development of the individual organism, was in Aristotle's thoughts, but he had practically no successors before Harvey (1578–1675), who discerned that every animal develops from an ovum, and that the formation of the body is gradual. But the founder of modern embryology was **Caspar Friedrich Wolff** (1733–1794), who showed that the ovum does not contain a preformed embryo, and that the organs may be seen being formed by gradual differentiation. This he called "epigenesis" in contrast to the current conception of "evolutio," which regarded development as the unfolding of a preformed miniature.

The first to follow in Wolff's steps were two Russian investigators, Christian Pander (1794–1865) and Karl Ernst von Baer (1792–1876). To von Baer belongs the credit of beginning comparative embryology, of defining the mode of development as being from the general to the special, of discerning that individual development might throw light on relationships, of discovering the mammalian ovum, and much more besides. Even von Baer did not recognise the

significance of the male cell or spermatozoon, which was made clear by **von Siebold, Kölliker** (1841), and others. In 1843, Martin Barry, a medical student in Edinburgh, saw for the first time the union of sperm and ovum in a mammal —the rabbit.

MATURATION AND FERTILISATION.—The modern study of the maturation of the germ-cells and the subsequent fertilisation, matters of great moment in connection with the problems of heredity, has been largely prosecuted by German investigators. Among those who have done important work, we may note Auerbach, E. van Beneden (Belgian), **Bütschli,** Fol, **De Bary, Strasburger, O.** and **R. Hertwig, Boveri,** and **Haecker.** The remarkable recent work showing the possibility of artificially inducing parthenogenetic development is especially associated with Yves Delage in Paris and Jacques Loeb in Chicago. Very noteworthy in quite another connection was the discovery by two Japanese botanists, that the pollen-grain of the Gingko liberates a mobile male element or spermatozoon, like that of ferns and other non-flowering plants.

The fertilised ovum divides and redivides to form a ball or a disc of cells, and the next great step in development is the establishment of germ-layers (the outer epiblast and the inner hypoblast, between which a mesoblast may be interpolated). This subject of germ-layers has occupied a very large part of the attention of embryologists (*e.g.* of the brothers **Hertwig**), for it is an important step in development, and the evidence of fundamental structural resemblance (*homology*) between similar structures in different types depends in part on their being traceable to a similar origin from the germ layers. An important step, now forgotten, was made in 1849 by Huxley, who collated the epiblast and hypoblast of embryos with the outer and inner cell layers in the tubular body of polyps, which Allman soon afterwards termed ectoderm and endoderm.

One of the great "lifts" that Biology has received in

Britain was due to Francis M. Balfour, who founded an embryological school in Cambridge, and by his own work and that of his students enabled this country to hold up its head as regards the study of development. He achieved much directly, as a teacher and a personality, but he also exerted great influence by the production of his *Comparative Embryology*, certainly a very remarkable book. It was a work of great erudition combined with critical insight, and it gave to embryology a synthetic presentation such as it had not previously received. We would ask those who have been in recent times so loyal to their country that they have cast historical accuracy to the winds, to take this book and to estimate from the authorities so carefully cited what a big hole would be made if the German contributions were removed. Von Baer is linked to Balfour by many who have done distinguished pieces of embryological work: Alex. Agassiz, Claus, Dohrn, Gegenbaur, Goette, Haeckel, His, Kölliker, Kowalewsky, Lacaze-Duthiers, Lankester, Leuckart, Loven, Metschnikoff, Johannes Müller, Ratke, Remak, Sars, Sedgwick, Semper, Steenstrup, Van Beneden.

RECAPITULATION DOCTRINE.—One embryological generalisation at least has passed into general thinking, and that, unfortunately, without the saving clauses which its scientific statement requires. We refer to the recapitulation doctrine, or biogenetic law that individual development tends to be a condensed recapitulation of steps in racial history. There are abbreviations and telescopings, there are special adaptations to the special conditions of present-day development, and there is a remarkable specificity in every embryo from start to finish, and there are other provisos to be kept in mind lest we take in too easy-going a fashion the idea of individual development recapitulating racial history. But there is a great truth in the conception that the living hand of the past is in the present. Especially in the development of particular organs (organogenesis) is the recapitulation of evolutionary stages to be seen. Now it is interesting that this is a peculiarly German idea. It is hinted at by

Meckel in 1821, by Kielmeyer, Oken, and Goethe; a cautious form of it is given by von Baer; Louis Agassiz, a non-evolutionist, states it in his *Essay on Classsification* (1859); Fritz Müller was its enthusiastic exponent; Haeckel its most skilful and convinced champion; Herbert Spencer incorporated it in his system.

PHYSIOLOGY OF DEVELOPMENT.—Embryology is in part concerned with describing stages in development, and the result is a cinematograph of the life-history. But it has a deeper task—of analysing out the various processes that are at work in the individual becoming or "morphogenesis." The most strenuous attempt in this direction is certainly that of Wilhelm Roux, who started the *Archiv für Entwickelungsmechanik*, and the contributors to this record of research represent all the nationalities. We do not wish to suggest that Roux was the first to inquire into the immediate conditions operative in development, remembering, for instance, the work of Wilhelm His (*Unsere Körperform und das Problem ihrer Entstehung*), Rauber's *Formbildung und Formstörung* (1880), and Camille Dareste's *Tératogènie Expérimentale* (Paris, 1877); but to Roux belongs the credit of focussing the problems, of making important contributions towards their solution, and of setting many workers agoing.

EXPERIMENT IN EMBRYOLOGY.—Many investigators—*e.g.* Driesch, O. Hertwig, Born—have studied the behaviour of a developing ovum subjected to slight constraint between glass plates, and have shown the extraordinary capacity for re-adjustment that many early embryos possess. The effect of centrifuging developing eggs has been observed by O. Hertwig and others; the effect of puncturing one or more of the early segmentation cells has been watched by Roux, O. Hertwig, T. H. Morgan, and others; the results of shaking segmentation cells apart have been finely studied by Chun, Driesch, E. B. Wilson, and others; the influence of altered chemical and physical conditions has been best analysed by Curt Herbst; the effect of radium rays on

development has been studied by Oscar, Paula, Gunther, and **Hertwig**; the study of non-nucleated fragments of eggs which sometimes admit of fertilisation and development has led **Boveri**, Delage, Morgan, and others to very interesting results. Thus we see that in the relatively recent employment of experimental devices in embryological research German investigators have had a leading part.

REGENERATION.—For many years naturalists had been familiar with the regenerative capacity among animals—the starfish regrowing a lost arm, the snail a lost horn, and the lizard a lost tail, and some, such as Réaumur, had almost discovered a law of its distribution. The first to do so clearly was, it seems, an Italian naturalist, Lessona, who noticed (1868) that the regenerative capacity tends to occur in those animals, and in those parts of animals, which in the natural conditions of their life are particularly liable to non-fatal injury. But the first biologist to see the significance and the fruitfulness of the study of regenerative processes, and to test the Darwinian theory in reference to it, was **Weismann**, who defended the thesis that "the power of regeneration possessed by an animal or by a part of an animal is regulated by adaptation to the frequency of loss and to the extent of the damage caused by the loss." Now one cannot exactly say that the subject has been neglected in Britain, but we have very little to show (in part, no doubt, because of the anti-vivisection Acts) compared with France, Germany, Austria, America. The subject is one of great fruitfulness, with relations to the problems of development, of adaptation, of heredity, of sex, and even of surgery. Yet we stand very badly. The leading contributions are due to **Barfurth**, Bordage, Loeb, Michel, **Müller**, T. H. Morgan, Przibram, **Tornier, Werner**, Wheeler, **Wolff**; and the best discussions of the problems are those of T. H. Morgan, Przibram, and **Weismann**.

CONCLUSION.—While embryological investigation was well begun in Britain by Harvey, it cannot be said to have risen again to that level until we come to the brilliant work

of F. M. Balfour and those whom he inspired. But there are at present only a few who sustain the tradition, and experimental embryology has still fewer representatives. It appears to us that the German succession from Wolff (1759) to Oscar Hertwig is the stronger—Meckel, Ratke, Hofmeister, Johannes Müller, Goette, Dohrn, Roux, Driesch, Herbst.

4. AETIOLOGY

THE EVOLUTION IDEA.—The Doctrine of Descent (*Transformisme* of the French, *Abstammungslehre* of the Germans) means that the present is the child of the past and the parent of the future. More concretely, it means that the plants and animals of the present day are the transformed descendants of ancestors on the whole somewhat simpler (except in cases of retrogression associated with parasitism and the like). The ancestors, in turn, are the lineal descendants of yet simpler forms, and so on backwards and backwards till we approach the literally first organisms or "Protists," about which we unfortunately know nothing. It is plain that this is a formulation of the way in which the present-day state of things has come to be. It is a modal formulation. It is hardly a theory—it is the only scientific way of looking at things. If the present-day phase of the realm of organisms has not come about as an evolution, then we do not know the mode of its becoming. The evolution idea is accepted by almost all biologists—not as a solution of problems, so much as a clear statement of them. There has been a long process of organic transformation—one race succeeding another, born from within its predecessor—one type giving rise to another type by gradual fluctuation or by brusque mutation—a long drawn-out trial and error adventure—a series of creative experiments on the organism's part.

EVOLUTION OF EVOLUTION IDEA.—The general idea of organic evolution has certainly been one of the most influ-

ential contributions that science has made to man's mental furniture, and, although it was Charles Darwin who made people believe in it, many minds shared in its development. Thus Professor H. F. Osborn calls attention to the "very striking fact, that the basis of our modern methods of studying the Evolution problem was established not by the early naturalists nor by the speculative writers, but by the Philosophers." He refers to Bacon, Descartes, **Leibniz,** Hume, **Kant** (whose grandfather was from Scotland), **Lessing, Herder,** and **Schelling.** "They alone were upon the main track of modern thought. It is evident that they were groping in the dark for a working theory of the Evolution of life, and it is remarkable that they clearly perceived from the outset that the point to which observation should be directed was not the past, but the present mutability of species, and further, that this mutability was simply the variation of individuals on an extended scale."

Coming down to the concrete evolutionists of chief importance who preceded Charles Darwin, we find in England Erasmus Darwin (1731–1802), in France Buffon (1707–1788), and Lamarck (1744–1829), and in Germany **Treviranus** (1776-1837) and **Goethe** (1749–1832). Again, the historical facts seem to suggest that nationality has little to do with the development of fundamental ideas.

FACTORS OF ORGANIC EVOLUTION.—The pre-Darwinian evolutionists were not merely clear as to the general doctrine of descent; they made definite suggestions as to the problem which remains the subject of active inquiry—the factors of organic evolution. Thus Buffon thought that environmental peculiarities were directly productive of changes in organisms; Erasmus Darwin maintained that wants stimulate exertions which produce transformation; Lamarck specially emphasized the transforming effects of changes in function and habit which were induced by new needs; **Treviranus,** whom Huxley ranked beside Lamarck, attached chief importance to the influence of a changeful environment both in modifying and in eliminating, and to

an internal power of progressive adaptation; **Goethe** recognised the moulding of form by function and by surroundings, but was a firm believer in an inherent growth-force. There were others with something definite to say, such as Etienne Geoffroy Saint-Hilaire (1772–1844), who emphasized the direct modifying power of the changeful environment, and believed in brusque variations or mutations induced in the embryo by external influences; the geographer **von Buch** (1773–1853), who recognised the importance of Isolation as a factor in the evolution of species—a suggestion developed by **Wagner**, Romanes, Gulick, and others. There was also Robert Chambers, whose line of thought was in part like Buffon's, in part like Goethe's.

But all sink into relative unimportance when we come to Charles Darwin (1809–1882), who vindicated the evolutionist interpretation and applied it to man, discovered (along with Wallace) the theory of Natural Selection, showed that variation and heredity were problems amenable to scientific treatment, and made clear such fundamental biological concepts as the struggle for existence and the web of life.

HAECKEL.—Prominent among those who stood by Darwin was **Ernst Haeckel** of Jena, now in his eightieth year. His historical position is with Spencer and Huxley and Wallace, for he was a champion of Darwinism, in the wide sense, in days when it had to be fought for. Much more Lamarckian than Darwin ever was, he otherwise agreed with most of Darwin's positions and was an enthusiastic supporter. He was distinctive in his systematisation of the evolutionist outlook into a philosophy which most professional philosophers regard as a naïve reincarnation of the hylozoism of the early Ionic school, and in its application of the evolution idea to the whole range of biology. Apart from this instinctive ambition to present a synthesis, Haeckel's work has been marked by his emphasis on the Recapitulation Doctrine and by his keenness in tracing out pedigrees and designing genealogical trees. His writings

have given many a fallaciously simple view of the problems of life, but this is partly due to careless reading, and to Haeckel's aggressive attacks on everything theological. It will be found that in reality Haeckel's general position is that of pan-psychism, not of materialism.

GERMAN CRITICS OF DARWINISM.—Many notable evolutionists in Germany (and elsewhere) have expressed their dissatisfaction with the central idea of Darwinism in the stricter sense, that the origin of new adaptations and new species can be described as due to the natural selection of fluctuating variations. One of the ablest of these critics was Carl von Nägeli (strictly a Swiss, but for most of his life a German), who brought against Darwinism seven well-considered objections, and advocated a theory of definite variation or orthogenesis—that steps in racial evolution are the expressions of growth-like change in a particular direction. Among those who have found evidence to support a belief in orthogenesis as an actuality (not necessarily excluding other modes) may be mentioned some distinguished American zoologists—Cope, Hyatt, Whitman, and Osborn. In Germany Nägeli's orthogenesis has found able supporters in **Eimer, Pfeffer,** and **Koken.**

Another notable critic, a botanist like Nägeli, was **Albert Wigand,** who devoted three volumes (1874, 1876, 1877) to exposing the unscientific character of the Darwinian Theory, and his extreme position has found considerable support in Germany (and in France too). **G. Wolff** speaks of the "episode of Darwinism," and suggests that it is best forgotten; another German critic speaks of "the death-bed of Darwinism," and another of "the softening of the brain of the Darwinians." But there are not many biologists of high standing willing to go the length of denying altogether the place of Natural Selection among the factors of evolution.

THE STRUGGLE FOR EXISTENCE.—The thesis has been recently maintained that the prevalence of the "Might is Right" doctrine in Germany may be correlated with a

widespread conviction that Nature's gospel, through Darwin, her prophet, is "Each for himself, and extinction take the hindmost," the cosmic rule being that careers are open to talons, that contention is the vital force, and that the survivors are necessarily the fittest. There is reason to fear that this fatal misunderstanding is widespread, but it is not confined to Germany. And as to swallowing garbled Darwinian philosophy, we have just been pointing out that extreme criticism of Darwinism has been particularly characteristic of Germany. It was one of the leading philosophical biologists of Germany who declared "Darwinism now belongs to history, like that other curiosity (*curiosum*) of our century (this was in 1896), the Hegelian philosophy; both are variations on the theme: how one manages to lead a whole generation by the nose." We have the profoundest respect for the author of this deliverance—which seems to us extremely unscientific—but we have quoted it to indicate the danger of labelling Germans as ultra-Darwinists.

As the matter is of fundamental importance, let us pause in our historical survey to notice that Darwin made it quite clear, over and over again, that the struggle for existence in which and by which nature sifts (*i.e.* organisms are discriminatively eliminated) includes very much more than internecine competition between fellows of the same kith and kin. He insists that the technical phrase is to be used "in a large and metaphorical sense." It includes all the reactions, competitive and non-competitive, self-regarding and other-regarding, with teeth and claws or with wits and kindness, individual and social, against limitations, difficulties, and dangers.

In another study[1] we have expounded a thesis, based on some study of nature and also based on some study of Darwin's works, that "progress depends on much more than a squabble around the platter; that the struggle for existence is much more than an internecine competition at

[1] *Darwinism and Human Life.* Melrose, London, 1909.

the margin of subsistence; that it includes all the multitudinous efforts for self and others between the poles of love and hunger; that it comprises all the endeavours of mate for mate, of parent for offspring, of kin for kin, as well as every detail of self-assertiveness; that existence for many an animal means the well-being of a socially-bound or kin-bound organism in a social milieu; that egoism is not satisfied until it becomes altruistic."

This is, of course, what Prof. Patrick Geddes has always taught; and it is, we believe, what Darwin (instinctively perhaps, rather than explicitly) taught. It has been recognised by Spencer, Kropotkin, Henry Drummond, and other thinkers, and admirably expounded recently by Cresson. What we are concerned to maintain is that the Darwinian idea of the struggle for existence is by no means restricted to the competition of piglings in the mire, or of brown rat against black rat, but only finds truth when it includes the multitudinous ways in which living organisms assert themselves against limitations and difficulties. A common view is that the essence of the struggle for existence is the direct competition within a species—a wolf a wolf to other wolves, which is bad Natural History, as the *Jungle Books* might have convinced us; or internecine war between allied species—brown rat always eliminating black rat—a diagrammatical instance with suspiciously few substantiated illustrations. Our thesis is that the struggle for existence is seen wherever living creatures press up against limiting conditions; wherever living creatures, with their powers of growing and multiplying, thrusting and parrying, changing and being changed, do in any way say, "We will live." The survivor in a plague-stricken family does not compete with his kin; he parries a microbe. And so it is along a great stretch of the line, though the picture of "nature red in tooth and claw" is also part of the truth. This broad and, we believe, Darwinian conception of the Struggle for Existence has been stated by few, but we find it more or less clearly here and there—*e.g.*

in the *Handbook of Darwinism*, by Prof. L. Plate, who succeeded Haeckel in the chair of Zoölogy in the University of Jena.

RECENT ADVANCES IN THE STUDY OF THE FACTORS IN EVOLUTION.—The interesting question now arises, What are the most important or most promising new developments in the study of the factors concerned in organic evolution, and with whom are they especially to be associated?

First, and especially to be associated with Weismann, is the widespread abandonment of belief in the transmission of individually-acquired somatic modifications. An active scepticism is justified until we find convincing evidence of the transmission of these "somatogenic modifications," which are directly due to pecularities in nurture and habit. They are important for the individual, they may be indirectly important for the race (Lloyd Morgan, Mark Baldwin, Osborn, Ward), but they do not form part of the raw material of progress. For that we must look to germinal or blastogenic variations.

Second, and especially to be associated with the work of Bateson and De Vries, is the growing belief that discontinuous variations or mutations are of more frequent occurrence than Darwin supposed. As is well known, Darwin was at one time inclined to attach much importance to these "single variations," as he called them, but was led away from this by his belief that they were rare and that they would be readily swamped by inter-crossing. Evidence is accumulating to show that they are not very rare, and that they are particularly transmissible. By a curious turn of inquiry, the doubt is rather about the transmissibility of the minute fluctuations (a little more or a little less) on which Darwin especially relied in his theory of the origin of new species by Natural Selection.

Third, and especially to be associated with the name of Mendel, a Silesian abbot, is the modern conception of "unit characters," that the organism is, in part, at least,

built up of definite factors or determinants which express themselves in particular characters, and are independently and intactly heritable, either present or absent in the offspring, but not blending with others so as to be lost. The peculiar Hapsburg lip, which has persisted in a stock for over four centuries; or the peculiar condition of the eye, called night-blindness, which has persisted in a lineage for over two centuries; or the state of the hands, known as brachydactyly, where the fingers are all thumbs (with two joints instead of three), which has persisted in a family for six generations, may be cited as satisfactorily proved " unit characters " in man.

Fourth, and especially to be associated with the names of Francis Galton and Karl Pearson, is the application of statistical methods to the study of the facts of variation, inheritance and selection. This is not so much a new idea as an old method applied to a new set of data; and the progress towards an exact science that Biology has made since Biometrics began furnishes eloquent evidence of the value of the mathematical organon.

In more ways than we can mention the study of organic evolution, though still very young, has become more exact and experimental. It is no longer very useful for the mere theorisers to write books or pamphlets exposing the fallacies of Darwin or of Weismann—we must have measurements, experiments, and precise facts, not views or opinions. Perhaps it is unwise to use phrases like Experimental Zoology, as if that were a new division of the science, but it indicates a coming of age, when the experimental test is everywhere exacted. We do not share the view that all the wisdom is with the experimenters and none with the essayists (as we suppose even Spencer would be called), for there is need for synthetic attempts if only to show analysis where to put in its lever; and there is a sense of perspective and proportion and consistency which requires to be cultivated as well as ingenuity in devising experiments and skilled patience in carrying them through. Thus we attach to Weismann's

essays, for instance, much more importance than some of the modern experimenters are inclined to admit. They have directly prompted a quite extraordinary amount of recent concrete work, which has confirmed as well as corrected anticipations; and we absolutely refuse to accept the view that clear and consistent thinking is not a form of research.

HEREDITY.—The study of heredity is the study of the genetic relation between successive generations. That relation is sustained by germ-cells which are the vehicles of inheritance and unite in fertilisation. It follows that there could be no satisfactory science of heredity until it was clearly understood that the beginning of the individual life is in all typical cases to be found in the fertilisation of an ovum or egg-cell by a spermatozoon or male element. One is apt to forget how relatively modern is the knowledge of that fundamental fact. Even von Baer (1835) was inclined to regard spermatozoa as microscopic parasites, and Sir Richard Owen included them in a article on "Entozoa" (internal parasites) in Todd's *Cyclopædia of Anatomy and Physiology*. Although Spallanzani had proved in 1786 that sperms were essential if ova were to develop, the failure to understand what fertilisation meant lasted till about 1840. **R. Wagner** emphasized the fact that spermatozoa were present in all mature males; **von Siebold** demonstrated their presence in Invertebrates; in 1841 **Kölliker** proved that they arose as cells in the male organs or testes; in 1843 Martin Barry saw the union of spermatozoon and ovum in the rabbit; in 1865 **Schweigger-Seidel** and **La Valette St. George** showed that the spermatozoon has a nucleus as other cells have. If we included more names in the history of the establishment of the simple conclusion that fertilisation is the intimate and orderly union of two cells, the impression would be the same—that the contributions made by German investigators are predominant.

Similarly, as regards plants, it was **Camerarius** (1665–1721), a professor at Tübingen, who first proved experimen-

tally (1691–1694), that seeds capable of germination cannot be formed without the co-operation of pollen. That fertilisation in plants means a mingling of two different substances was clearly shown by **Kœlreuter** (1733–1806). Steps of some importance were taken by Andrew Knight, William Herbert, **J. Gärtner, K. F. Gärtner,** Robert Brown, and others, but it was not until 1846 that Amici demonstrated that the egg-cell within the embryo-sac of the ovule is stimulated to development by the advent of the end of the pollen-tube. This was at once corroborated by **von Mohl** and **Hofmeister.** And if we pass from flowering plant to Cryptogams and ask who first observed the actual union of male and female elements there, the answer is surely **Pringsheim** and **De Bary.** In his fascinating history of Botany, Sachs gives all the details of the discovery of sexuality in flowering and flowerless plants, and in summing up a section says in his characteristically generous way: "In this case also it was reserved for Darwin's wonderful talent for combination to sum up the product of the investigations of a hundred years, and to blend **Kœlreuter's,** Knight's, Herbert's and **Gärtner's** results with **Sprengel's** theory of flowers into a living whole in such a manner that now all the physiological arrangements in the flower have become intelligible both in their relations to fertilisation, and in their dependence on the natural conditions under which pollination takes place."

THREE MAIN LINES OF INVESTIGATION.—The study of heredity has been prosecuted along three main lines—(1) by the microscopical study of the germ-cells, their genesis, maturation, and fertilisation; (2) by genetic experiments, *e.g.* in hybridisation and in-breeding; and (3) by the statistical comparison of the hereditary qualities of successive generations. This may be taken as a test-case as regards the two questions before us: (*a*) whether nationality means much in the progress of science, and (*b*) whether the contributions made by the German investigators have been of great importance. It is a good case to take since the history is all recent—practically beginning with Darwin, who

showed that the problems were open to scientific treatment. We may give the names of some of the most important investigators on each of the three lines indicated above. The microscopical study of the germ-cells has been prosecuted by investigators like van Beneden, **Boveri,** Delage, Driesch, Farmer, Gates, Guignard, **Haecker, Herbst, O.** and **R. Hertwig**, Loeb, T. H. Morgan, **Roux, Strasburger, Weismann,** E. B. Wilson. On this line in particular, the German contributions have been of great importance.

Important genetic experiments have been made by Agar, Bateson, **Baur,** Biffen, **Boveri,** Castle, **Correns,** Cuénot, Darbishire, Davenport, De Vries, Doncaster, East, Ewart, Hurst, Jennings, Johanssen, Kammerer, Kellogg, **Klebs,** MacBride, MacDougal, T. H. Morgan, Punnett, Spillman, Tower, Toyama, Tschermak, Webber. In this line the British and American work seems to be most important. Darwin and Mendel stand by themselves.

Biometric studies of heredity are represented mainly by Galton, Pearson, Pearl, Weldon, Heron, Johannsen, Yule. Quételet (1796–1874) was the first to use statistical methods in the study of human faculties. The botanist **F. Ludwig** should also be mentioned.

ACQUIRED CHARACTERS OR MODIFICATIONS.—One of the most important changes in general thinking in regard to heredity is the fading away of the belief in the transmission of particular bodily modifications acquired by the individual as the direct result of peculiarities in function and environment. The evidence of the transmission of these so-called "acquired characters" is very unsatisfactory and unconvincing, and there are few biologists who believe in "modification-inheritance" in the way in which it used to be believed in before the modern scepticism set in. Now if there is any one man responsible for this widespread and very important change of opinion, it is **August Weismann** (1834–1914). He focussed the scepticism, he subjected the evidence in favour of a belief in the transmission of modifications to destructive criticism, he made a few experi-

ments and suggested more, and he kept the discussion going for a quarter of a century. We have given elsewhere a history of opinion on this question, and it is well known that Weismann's scepticism was not novel any more than Darwin's doctrine of descent was. The idea that individually-acquired modifications are not transmitted was suggested by **Kant** and **Blumenbach,** more clearly by James Cowles Prichard (1826), somewhat incidentally by **His** and **Pflüger.** The most interesting prevision was Galton's, but he did not follow it up. In 1875 he stated his opinion that the current theory of the inheritance of characters acquired during the lifetime of the parents " includes much questionable evidence, usually difficult of verification. We might almost reserve our belief that the structural cells can react on the sexual elements at all, and we may be confident that at the most they do so in a very faint degree —in other words, that acquired modifications are barely, if at all, *inherited* in the correct sense of that word." This was published about eight years before the first of Weismann's famous essays on heredity, but it was to Weismann rather than to Galton that the change of expert opinion was due.

5. MEDICINE

All that can be done within our limits is to refer to a few of the contributions to medical science which have been made by German investigators. It seems to be near the truth to associate the beginning of scientific medicine in Germany with **Johannes Müller** (1809–1875), that extraordinary genius who gave new life to everything he touched. He certainly had much to do with convincing his contemporaries of the imperativeness of using experimental methods in medical investigation. In his interesting *Apostles of Physiology,* Professor Stirling mentions that Müller had among his pupils Schwann, Henle, Brücke, Du Bois-Reymond, Virchow, Helmholtz, Claparède, Reichert, Lieber-

kühn, Remak, &c. It is usual to speak of J. L. Schönlein (1793–1864) as one of the pioneers of a scientific school—the so-called "natural history school"—of medicine. He is memorable for his prophetic discovery that the scalp disease called favus is due to a parasitic fungus. Another great pioneer was Rokitansky (1804–1878), of Vienna. We believe that the first clinical laboratory in the world was opened in Munich in 1885, by von Ziemssen (1829–1902).

VIRCHOW.—The publication of Virchow's *Cellular Pathology* (in 1858) marked the influence of the Cell Theory on the scientific study of disease. For Virchow tracked disease downwards and inwards till he could describe many forms of it in terms of cells gone wrong. Morbid growths and destructive processes were analysed into anomalies of cell-multiplication and cell-metabolism. He had a clear view of pathology as the seamy side of physiology, and therefore with its optimism, for disease is not something mysteriously intruding, but in some cases, at least, a constitutional variation which misses the mark. Many diseases may be described as metabolic processes which have got out of place, out of proportion, and out of time. As Virchow (1821–1902) did not in those days (1858) know about microbes as producers of disease, he was at pains to show, as he said, that "diseased life produced no cells for which types and ancestors were not forthcoming in normal life," and it was in this connection that he coined his phrase, *omnis cellula e cellula*, every cell from another cell. Central in his work and teaching was the conception of the organism as a system of cells which are ever changing and being changed, experimenting and suffering violence. As Professor Greenfield put it: "It is the cell as the living active agent in the production of disease, and the arrest or perversion of its action by disease-producing causes, which have the highest place in his thoughts." Certainly Virchow was one who laid foundations. He established a school, *e.g.* **Reinhardt, Traube** (1818–1876), **Cohnheim** (1839–1884), and his influence penetrated the

whole world of medicine. His contemporary, the physiologist Ludwig (1816–1895), had also a far-reaching effect on medical science. His studies on the function of the kidney, on secretion, on vaso-motor nerves, &c., are famous, and he was the first to make an instrument to record the beating of the heart. He worked and taught in Marburg, Zürich, Vienna, and Leipzig. Professor Stirling writes of him: "From each and all of these centres his numerous pupils published under his direction and guidance an amount of work the extent and originality of which is probably unsurpassed. His own papers are epoch-making, and he founded the largest school of physiologists of modern times." He should rank along with Claude Bernard, du Bois-Reymond, Brücke, Donders, and Helmholtz.

Applications of Physiology.—Some of the most striking advances of modern medicine are the direct outcome of the advances in physiology. We have already referred to the far-reaching influence of the increasing knowledge of internal secretions (Claude Bernard, Brown-Séquard, Minkowski, Pawlow, Bayliss and Starling, Abderhalden, and so on). Even in surgery the recognition of the potency of adrenalin by Schäfer and Oliver, and its isolation by Takamine, have had important results. Most striking of all is the treatment of myxœdema with extract of the thyroid gland—a triumph of experimental medicine for which we have largely to thank Sir Victor Horsley and his pupil, Dr. Murray, in the first instance; and Dr. Hector Mackenzie, and Dr. Howitz in Copenhagen, in the second instance, for feeding methods.

Microbic Nature of Many Diseases.—The idea that the intrusion of animalcules may cause disease is old, and historians have unearthed numerous guesses at truth which are interesting, though they are not to be misunderstood as anticipations of the great discovery, which must be especially associated with the name of Pasteur. Thus **F. G. J. Henle** (1810–1885), a pupil of Johannes Müller and contemporary with Schwann, should be remembered for his remarkable

prevision (1840) that contagious diseases must be due to " parasitical beings, which are among the lowliest, smallest, but at the same time most prolific, which are known." Those who generalise the formula that it has been characteristic of German science to elaborate the discoveries of others should take into consideration the number of cases where the anticipation was first expressed in Germany.

Among the anticipators of Pasteur and Lister and Koch, may be especially noted (see Macfie's *Romance of Medicine* for some very interesting facts) Agostino Bassi, an Italian physician, who wrote on the " muscardine " disease of silkworms in 1835, recognised its parasitic nature, suggested that this was the case with various human diseases, and both preached and practised antiseptic and aseptic treatment. Dr. Macfie also tells of what another pioneer, Semmelweiss, did in Vienna in lowering the enormous mortality from puerperal fever by antiseptic treatment.

Cagniard Latour has the credit of making one of those simple and apparently not very momentous discoveries, which turn out to be revolutionary. In 1836 he showed that the yeast-ferment of beer consists of living cells " acting on sugar through some effort of their vegetation." This led on to Pasteur's evidence that micro-organisms cause many fermentations, all manner of rottenness, and many diseases; and this led on to the antiseptic methods of Lister and his proof of their success.

The first microbe actually detected as the cause of a specific disease was the anthrax bacillus, whose terribly fatal rôle, causing splenic fever in man and his stock, was demonstrated by Davaine and Rayer in 1863, and it was in the previous year that Pasteur was led to his brusque conclusion, " La génération spontanée est une chimère." If a disease be caused by microbes working harmfully in the body, and if a microbe always springs from another of the same kind, it follows that certain diseases may be prevented by keeping microbes out (as in Lister's antiseptic treatment of wounds), or may be successfully antagonised

by introducing something which checkmates the intruders (as in Pasteur's vaccine treatment of anthrax discovered in 1881).

In the list of those who have followed up the work of Pasteur there are many German discoverers of renown. Two of the most important events in the history of the modern world were due to **Robert Koch**—the complete isolation of the anthrax bacterium (observed by Davaine, Rayer, and Pollender, and much studied by Pasteur), and the discovery of the bacillus of tuberculosis in 1882. The latter ranks beside Laveran's demonstration of the malaria organism, and beside **Schaudinn's** discovery of the Spirochaet of syphilis (1905). For combating the last-named terrible disease, an effective mode of treatment (Salvarsan) has been discovered by **Ehrlich.** We may also note that **Eberth** discovered the bacillus of typhoid fever, **Klebs** and **Löffler** that of diphtheria, Nicolaier that of tetanus, Bruce that of Malta fever. The discovery of the organism of Asiatic cholera was due to **Koch.** Very important also is **Löffler's** discovery of filterable viruses.

ADAPTATIONS AGAINST DISEASE.—The struggle for existence continuing with intensity for millions of years has led to the adoption of a parasitic mode of life by tens of thousands of organisms. They have evaded certain forms of the struggle by becoming dependent upon their hosts, which are no more to most of them than a cheese to its mites or a ship to its rats. In the majority of cases the old-established parasitisms are not of a very sinister character; had this been so they would not have lasted. Making some notable exceptions, *e.g.* for the ichneumon-fly larvæ, which develop inside caterpillars and destroy their hosts, we may say that most organisms are not greatly injured by their parasites. They have become constitutionally accustomed to them; a *modus vivendi* has been evolved. But what is often fatal, causing epidemics of the most serious kind, is the intrusion of new parasites into hosts unaccustomed to them. That is what happens, for instance, when new terri-

tory is exploited by man and his domestic animals and cultivated plants, or when by mischance the parasites are transported to territory where the organisms are unprepared for them.

Since both of these contingencies are of frequent occurrence, and since it is also likely that hitherto free-living organisms may be driven to adopt the parasitic evasion, it is of the utmost importance that there should be counteractive adaptations. This brief introduction has been necessary in order to make clear a few illustrations of the important researches that have been made in the study of adaptations against parasitic disease. We can only consider this from the point of view of the general biologist, but it seems to us perfectly clear that the great steps are quite irrespective of nationality. Thus we have Metschnikoff from Russia, **Ehrlich** from Germany, Almroth Wright from Ireland, Kitasato from Japan, **von Behring** from Germany, Bordet from France, and so on. Along with Ehrlich may be mentioned **E. Fischer,** and Brieger is memorable for his discovery of the toxins of some infections.

PHAGOCYTOSIS.—Metschnikoff showed that certain kinds of white blood corpuscles or other wandering amœboid cells attack, engulf, and digest intrusive Bacteria and the like. To this bodyguard of devouring cells the name of phagocytes is given, and their work is called phagocytosis. It is illustrated in manifold ways in almost every kind of animal from sponge to man. This is, necessarily, the baldest statement of a great discovery, and all manner of emendations must be taken account of. Thus there are some kinds of Bacteria which the phagocytes in the blood —of man, let us say—cannot under ordinary conditions attack. Sir Almroth Wright discovered, however, that if the blood-serum of an animal immunised to such Bacteria be injected into the patient in question, the phagocytes are enabled to deal with the Bacteria. It seems that the Bacteria are rendered susceptible to attack by something introduced with the injected serum. Sir Almroth Wright

called this substance opsonin, which means preparing the food.

While it was Metschnikoff who focussed the doctrine of phagocytosis, there had been various approaches to it. Thus it is very interesting to find that as far back as 1858 **Ernst Haeckel,** in one of his many anticipations, had called attention to the way in which the amœboid cells of a mollusc (Tethys) engulfed the particles of indigo which he injected. In 1867 **Cohnheim** (1839–1884) discovered the remarkable fact that the white blood corpuscles could work their way through the walls of the blood-vessels. In his vivid *Romance of Medicine* Dr. Ronald Campbell Macfie refers to a number of investigations, in which German workers played an important part, leading on towards the doctrine of phagocytosis. "In 1877 Grawitz noticed that when a fungus which grows upon lily-of-the-valley was introduced into the blood of mammals, it was seized by the white blood-cells. In 1881 the idea of phagocytosis seemed rapidly to ripen. In that year Gaule, Roser, and Sternberg all gave more or less precise expression to the notion." Great interest attaches to the studies of the botanist **Pfeffer** on chemotaxis or the attraction of cells to influences from a distance.

According to Metschnikoff, the anti-bodies are produced by broken-down poisoned phagocytes, but there is another famous interpretation (not necessarily antagonistic), the side-chain theory of **Ehrlich,** according to which immunisation means that the blood becomes loaded up with "side-chains" or free groups of molecules belonging to the protoplasmic mixture, and that these unite in the blood with the poison molecules and, by satisfying their chemical valency, render them harmless. Here, too, should be noted another important contribution from a German laboratory, namely, the evidence adduced by **Weigert** that the production of anti-bodies is far in excess of the poison to be neutralised. One unit of diphtheria toxin is sufficient to produce half a million units of anti-body. Our references to such an

intricate question as immunity must be very superficial. But it will be admitted, we believe, by all, that for all time coming the name of Ehrlich will be honourably associated with the study of what is one of the most marvellous and practically important of vital adaptations. It matters relatively little whether Ehrlich's ingenious theory of the reaction between toxin and antitoxin be quite adequate or not. Along the lines he has so brilliantly illumined the solution lies. Dr. W. T. Councilman, a recognised authority, Professor of Pathology in Harvard University, writes in regard to Ehrlich's theory: "Few hypotheses have been advanced in science which are more ingenious, in better accord with the facts, have had greater importance in enabling the student to grasp the intricacies of an obscure problem, and which have had an equal influence in stimulating research."

It is usual to distinguish natural immunity from acquired immunity, and two kinds of the latter—"active," through having had the disease, and "passive," through the introduction of weakened strains of the microbe (as in vaccination against smallpox), or of products of the life of these microbes (as in the case of diphtheria). Here we come to the names of Kitasato and **von Behring**, who made mankind their debtors by their discovery in 1890 of the counteractive or "anti-body" to the diphtheria parasite. This extremely dangerous parasite produces poisons in the body which tend to stop the action of the heart, and so forth, but they also provoke the cells of the body to secrete an antidote. Life depends on the ratio between poison and antidote. It has been found, however, that the antidote in man can be re-inforced by injecting prepared serum from a horse which had been inoculated with the diphtheria parasite. This has been one of the great life-saving discoveries of our time.

Another important contributor to the investigation of immunity was **Buchner**, who showed that the virtue of the immunised blood is due to an albuminoid substance which

he called " alexin." To this Bordet and others added the demonstration that the alexin was not bactericidal until a " sensibilising substance " in the blood has first made the Bacteria vulnerable. According to Ehrlich, the sensibilising substances or " amboceptors " or go-betweens, which are set free from poisoned cells, are able to bring the microbe and the alexin together, with the result that the microbe is neutralised.

Similar to the anti-diphtheritic serum, which has both preventive and curative efficiency, is the anti-tetanus serum (von Behring and others), the anti-typhoid serum, the anti-plague serum, &c., and it goes without saying that the methods are being extended and improved persistently.

The names of Bruce, Manson, and Ross stand out illustriously in connection with man's struggle against the micro-organisms which cause, and the insects or other creatures which disseminate, tropical diseases; but it will probably be granted that from **von Pettenkofer** (1818–1901) onwards Germany has led in the department of Public Health and in experiments towards an increased biological control of life.

It may be of interest to recall the awards of the Nobel Prizes in Medicine:

1901. **Von Behring**
1902. Ross (Br.).
1903. Finsen (D.).
1904. Pawlow (R.).
1905. **Koch.**
1906. Ramon y Cajal (Sp.).
1907. Laveran (F.).
1908. **Ehrlich** and Metschnikoff.
1909. Kocher (Swz.).
1910. **Kossel.**
1911. Gullstrand (Sw.).
1912. Carrel (U.S.A.).
1913. Richet (F.).

B. CHEMISTRY

CONSERVATION OF MATTER.—In our brief survey of Chemistry we need not go farther back than 1777, when the French chemist Lavoisier (1743–1794) " with the balance in his hand vindicated the universality of the principle of the conservation of matter." He was probably the first to see clearly that " the total mass of the substances taking part in any chemical process remains constant." The state of the matter may altogether change, as when the barrel of gunpowder explodes, but the amount remains the same. Lavoisier showed that in the process of combustion, the burning substance unites with oxygen, and that although the end may be very different from the beginning, the quantity of matter remains constant. He also reached forward with genius to the idea that heat is the energy that results from the imperceptible movements of the molecules of a substance. But the advance which we particularly associate with the name of Lavoisier was the establishment of the fact of the conservation of matter, which was not only fundamental theoretically, but supplied a quantitative test by which the accuracy of research could be continually judged.

Modern chemistry dates from the time when the burning fire began to be in some measure intelligible, and if we associate that with one man it should be with Lavoisier. But we must hasten to say that he stood on the shoulders of other workers, such as Priestley, who discovered oxygen in 1771, Cavendish, who showed that water is a combination of hydrogen and oxygen in 1784, and Scheele, the Swede (Pomeranian), who also discovered oxygen in 1774. More than a century before, John Mayow had almost got at the truth that combustion means a union of something in the air with inflammable particles in the stuff that burns.

THE ATOMIC THEORY.—It is to the Quaker chemist, John Dalton, that we owe the first clear statement of the

fundamental fact that substances, both simple and compound, always combine in definite proportions of their weights, and the architectural theory that substances are composed of minute distinct particles or atoms, which arrange themselves along with other atoms into more complex groups in chemical combinations. This notable conception, which " at once changed chemistry from a qualitative to a quantitative science " (Roscoe), had been in part suggested by the physicists—indeed by Newton himself; and even in chemistry there had been searchings after it—for instance, by **J. B. Richter** and by Proust.

The general problem of the atomic view of nature is to form conceptions of material architecture which will serve for the chemical and physical formulation of changes that are observed to take place in things. A multitude of investigations, most of them too technical to admit of statement in a sketch like this, made for the development of Dalton's fertile idea. Sir Humphrey Davy (electrochemistry), Gay-Lussac (law of volumes), Dulong and Petit (specific heat), Mitscherlich (isomorphism), and others made important contributions, and by the third decade of the nineteenth century the Swedish chemist Berzelius had made great progress with the determination of atomic weights. Soon, however, revision became imperative, and in this many great chemists, *e.g.* **Liebig**, Dumas, Stas, took part. In 1858 Cannizaro utilised specific heat data as a check to other methods of determining atomic weights, and various glimpses were got of regularities connecting the different numbers (Prout, Meinecke, Mendelejeff, **Meyer**).

On another line—the study of gases—great advance was made. This, as usual, is a long story, from Boyle (1662) and Mariotte (1679) to Charles and Gay-Lussac, and so to Avogadro's law in 1811—one of the foundation-stones of modern chemistry. Avogadro's hypothesis: " Equal volumes of gases, equal numbers of particles " was confirmed by Ampère in 1814, but neither won the attention of contemporary workers. The work of Laurent in 1846, and the

discovery of disassociation by St. Claire Deville in 1857 were also important. But the kinetic theory of gases, which was needed to harmonise the laws of Boyle, Gay-Lussac, Avogadro, and others came from the physical, rather than from the chemical side. The early suggestions of Daniel Bernoulli (1738) and of Waterston, Graham's discovery of the law of diffusion, the work of Herepath, Joule, **Krönig, Clausius,** and Clerk Maxwell, are some of the steps in the long history of the kinetic theory of gases, one of the revolutionary concepts of modern science. According to this theory, a gas consists of innumerable particles moving with high velocity; overflowing into any free space that is available, thus securing that there is the same average number in every unit of volume; impinging on the containing walls, if there are any, and thus causing pressure which increases with the number of molecules and the mass and velocity of each.

The extension of the atomic conception to solids, in which the mutual displacement of the molecules is not easy, is in part wrapped up with the study of crystallisation begun by Steno the Dane in 1669, invigorated by the genius of Haüy in 1781, continued by many workers such as **Weiss** and **von Lang, Klaproth** (1798) and Mitscherlich, and so on to the beautiful work of **Lehmann** on fluid crystals. The extension of the idea to liquids must be especially associated with the epoch-making work of Van't Hoff—*La Chimie dans l'Espace* (1875)—which seeks to formulate a geometrical conception of the way in which atoms may be supposed to be placed in space. The founder of this "stereochemistry," to which Wollaston looked forward, was Pasteur, and notice should also be taken of the work of **Kekulé** (1829–1896), **Wislicenus** (1835–1902), and Le Bel.

Liquefaction of Gases.—An interesting line of work in which Britain comes out well is concerned with the liquefaction of gases. About the beginning of the nineteenth century, Northmore and others liquefied sulphurous acid gas, but the real beginning may date from the work of

Faraday and Davy in 1823. Among those who have contributed notably to the striking series of experiments may be mentioned—Thilorier (carbonic acid snow, in 1835), Andrews (definition of the critical point, in 1869), Pictet and Cailletet (liquefying oxygen in 1875–1877, &c.), Wroblewski and Olszewski (two Polish investigators who liquefied nitrogen in 1883), and Dewar (liquefying hydrogen in 1898 in the laboratory of the Royal Institution, where Faraday won his first successes).

DEVELOPMENT OF ORGANIC CHEMISTRY.—The latter half of the nineteenth century was marked by the rapid development of organic chemistry. Among the factors in this may be noted (1) the elaboration of more perfect methods of determining the chemical composition of organic substances (Gay-Lussac, **Liebig, Wöhler, Bunsen,** Dumas, and many others); (2) the recognition, which may be associated with the name of Berzelius, that organic compounds could not be separated by any hard and fast line from inorganic compounds, but illustrated similar laws; (3) the fascination of the methods of synthesis which give the chemist a creative power; and by the opening up of practical applications, such as those of coal-tar products.

We must not attempt to follow the history, but it is not difficult to understand that the development of organic chemistry on its theoretical side involved the specialisation of the atomic theory. Just as the study of gases led from the atom to the molecule, so the study of organic compounds led to theories of "radicals," "types," "nuclei," "equivalents," and "valencies," all of them attempts to reach conceptions of material architecture that would fit the facts. Just as it had been shown (Ampère, 1816) that the salts of ammonia can be conveniently studied by regarding them as salts of a compound element NH_4, so Berzelius, Dumas, **Wöhler, Bunsen, Liebig**, and others tried to bring organic compounds into line with inorganic compounds by supposing that they contained compound radicals, like cyanogen, which behave like elements. The idea of "sub-

stitution" worked out by Dumas (1840) is regarded by Roscoe as very important historically, being the germ of Williamson's researches on etherification and those of Wurtz and Hofmann on the compound ammonias—investigations which lie at the base of modern organic chemistry. The "radical" theory was characteristically German, *e.g.* **Kekulé** (1829–1896), **Kolbe** (1818–1884), **Hofmann** (1818–1892); the "type" theory French, *e.g.* Laurent and Wurtz (1817–1884); the idea of "valency," British, *e.g.* Frankland (1877) and Couper. The working out of the theory of "valency," *i.e.* of the capacity of the atom for combining with other atoms, is especially associated with Kekulé, Frankland, and Kolbe.

Liebig's impression of the state of chemistry in Britain in 1837 was not sanguine. In one of his letters to Wöhler, quoted by Merz, he writes: "I have traversed England, Ireland, and Scotland in all directions, have seen much that is astonishing, but have learned little: whence is scientific knowledge to come in England, as the teachers are so inferior? Among older men, Thomson is still the best; among younger men, Graham: modest and unassuming, he makes the most beautiful discoveries. Nevertheless, a splendid nation, &c."

SYNTHETIC ACHIEVEMENTS.—Even after it became plain that the complex substances characteristic of plants and animals do not contain any peculiar elements, but are mostly combinations of carbon, hydrogen, oxygen, and nitrogen, it continued to be believed that these "organic substances" could not be produced apart from life. It was therefore a very important step when **Wöhler** in 1828 effected the synthesis of urea—the characteristic waste-product of the higher animals. Starting from cyanic acid, which he had discovered in 1828, he found that urea was formed upon the evaporation of a solution of its ammonium salt. His synthesis was not complete, since he started from cyanic acid, which would now be classed as an organic compound, and the same remark applies to Henry Hennell's synthesis

(1826-1828) of alcohol from ethylene. But it may be said of both that they indicated the beginning of the end of "vital force" as a chemical factor, and the beginning of a long series of remarkable synthetic achievements, such as the artificial building up of indigo, formic acid, grape-sugar, salicylic acid. One of the most prominent workers on this line is **Fischer**. Indigo was synthesised in 1878 by **Baeyer.**

COAL-TAR COLOURS.—From a lecture by Professor J. J. Stevenson, in 1897, we may quote a historical reference to the utilisation of coal-tar. "Sixty years ago an obscure German chemist obtained an oily liquid from coal-tar oil, which gave a beautiful tint with calcium chloride; five years later, another separated a similar liquid from a derivation of coal-tar oil. Still later, **Hofmann,** then a student in Liebig's laboratory, investigated those substances and proved their identity with an oil obtained long before by Zinin from indigo, and applied to them all Zinin's term, Anilin. The substance was curiously interesting, and Hofmann worked out its reactions, discovering that with many materials it gives brilliant colours. The practical application of these discoveries was not long delayed, for Perkin made it in 1856. The usefulness of the dyes led to deeper studies of coal-tar products to which is due the discovery of such substances as antipyrin, phenacetin, ichthyol, and saccharin, which have proved so important in medicine." The industry started by Perkin's discovery passed from Britain to Germany, but the honours of scientific discovery were shared by both countries. The tradition is still maintained in Germany by **A. von Baeyer.**

THE PERIODIC LAW.—Many chemists have been attracted by the possibility of detecting serial relations among the chemical elements—Richter (1798), Prout (1815), Meinecke (1817), Döbereiner (1817), Pettenkofer (1850), and others. Very noteworthy was the work of Newlands and his *Law of Octaves* (1863-1864) and a paper by Odling in 1864 on the serial relations of the elements may also be referred to. Those who have gone carefully into the question have

generally concluded that in 1869 **Lothar Meyer** and D. Mendelejeff independently reached the same conclusion: that the properties of the elements are periodic functions of their atomic weights. Since then it has been shown that almost every well-defined property of the elements appears as a periodic function of the atomic weights. In his arrangement of elements into groups and series, Mendelejeff was compelled to leave certain blanks, and it is a fine corroboration of his classification that some of the missing elements whose atomic weights and other properties he predicted have been discovered, *e.g.* Scandium by Nilson, Gallium by Lecoq de Boisbaudran, Germanium by **Winkler.** The transmutation of the atoms of Radium (isolated by Mme. Curie), brilliantly studied by Ramsay, Rutherford, Soddy, and others, has afforded further corroboration.

INTERLINKING OF CHEMISTRY AND PHYSICS.—Whoever compares the lectures or the text-books of 1885 with those of 1915 cannot fail to be struck with a great change—the interpenetration of physical ideas. The new department of Physical Chemistry has developed with extraordinary vigour, and the whole venue is altered. One of the pioneers was **Kopp**; one of the leaders, till he turned aside a few years ago to other pursuits, was certainly **Wilhelm Ostwald.**

There is Thermo-chemistry, for instance, which measures the energy of chemical changes in terms of thermal units; there is Photo-chemistry, which studies the effects of light on chemical processes; and there is Electro-chemistry, whose foundation was laid by Faraday. Among the great contributions along this line may be noted those of Williamson (1851), **Clausius** (1857), **F. Kohlrausch** (1880), Arrhenius (1884), **Planck,** Willard Gibbs, **Helmholtz,** Jahn, van't Hoff, Duhem, and **Ostwald.** Of great moment was the theory of ionisation suggested by Svante Arrhenius, who proved, in 1884, that definite and quantitative relations exist between electrical and chemical properties. The nature of chemical affinity remains obscure, but a mode of measuring

it has been attained by the development of electro-chemistry, and with this the name of Ostwald (1889) may be justly associated. It seems likely that when the history of chemistry is brought up to date, emphasis will be laid on the fundamental nature of the work of Willard Gibbs.

Writing of the relatively young sub-science of physical chemistry, Merz says: "Early, and for the most part isolated, labourers were **Kopp** and **Hess** in Germany, Regnault and Berthelot in France, Julius Thomsen in Copenhagen. They (with many younger men) can be considered as the founders of the modern science of physical chemistry, which has received an elaborate exposition in the great work of Professor **Ostwald**. This work is probably quite as epoch-making in the domain of chemistry as Thomson and Tait's *Natural Philosophy* has been in that of physics."

CIRCULATION OF MATTER.—One of the contributions that chemistry has made to everyone's world-picture is that of the circulation of matter. All things are in flux, but no particle of matter is ever lost or gained. One incorporation succeeds another; one incarnation another. We see elements passing from the inorganic world into the plant, and thence to become part and parcel of the animal, and thence, with the help of Bacteria, back to air and water and dust once more. It is thus that the world goes round, and the idea has been of great practical and theoretical importance. If we are to associate it with any particular name it should surely be with **Justus Liebig** (1803–1873). This illustrious German, himself a student under the French chemist Gay-Lussac, became the master of one of the greatest schools of chemistry, the initiator of chemical laboratories, a pioneer of modern organic chemistry, one of the prompters of chemical physiology, the founder of agricultural chemistry, and the discoverer of many important practical applications. Along with Liebig's work we venture to associate the popular book of **Moleschott**, *Kreislauf des Lebens*, which expounds the idea of cyclical development, familiar to readers of Huxley and Foster.

Merz mentions that Mohr's *History of the Earth* discusses the circulation of the different elements.

CONCLUSION.—As chemistry is at once a very abstract and a very detailed science, the sketch we have ventured to give is necessarily difficult for the general reader, for whom alone it is intended. But what we have attempted, even if we have made some mistakes, is surely better than vague or dogmatic statements regarding the superiority of the contributions to chemical science which have been made by citizens of this or of that nation. We trust that the sketch illustrates how much chemistry owes to the contributions of German investigators, to men like **Liebig, Wöhler, Bunsen, Kekulé, Lothar Meyer, Ostwald.** To seek to belittle this debt seems to us not only ingratitude but foolishness. We append a comparative table (see page 134).

C. PHYSICS

"To take an old but never worn-out metaphor, the physicist is examining the garment of Nature, learning of how many, or rather of how few, different threads it is woven, finding how each separate thread enters into the pattern, and seeking from the pattern woven in the past to know the pattern yet to come." So Professor J. J. Poynting spoke of the aim of physics. Another modern master, Professor G. F. Fitzgerald, has said: "The properties of matter and energy, of energy and ether, and of ether and matter, are the subjects of investigation in physical science." In the main, physics has to do with describing and formulating observed similarities of motion.

The first of the foundation-stones of Physics was laid by Galileo (1564–1642), and the second by Newton (1642–1727), whose *Principia* was published in 1687. It will be noticed that Newton was born in the year of Galileo's death.

Among those who mainly developed the science of mechanics may be mentioned: Galileo, Descartes, Newton,

SOME OF THE GREAT CONTRIBUTORS TO CHEMICAL SCIENCE

BRITAIN	FRANCE	GERMANY	OTHER NATIONS
BLACK, 1728–1799	BERTHELOT, 1827–1907	BUNSEN, 1811–1899	ARRHENIUS (Sw.)
CAVENDISH, 1731–1810	BERTHOLLET, 1748–1822	FISCHER	AVOGADRO, 1776–1856 (Ital.)
DALTON, 1766–1844	CHEVREUL, 1786–1889	HOFMANN, 1818–1892	BERGMANN, 1735–1784 (Sw.)
DAVY, 1778–1829	P. CURIE, 1859–1906, AND M. CURIE (Pol.)	GMELIN, 1788–1853	BERZELIUS, 1779–1848 (Sw.)
DEWAR	ST. CLAIRE DEVILLE, 1818–1881	KEKULÉ, 1829–1896	CANNIZZARO, 1826 – 1910 (Ital.)
FARADAY, 1791–1867	DUMAS, 1800–1884	KOLBE, 1818–1884	WILLARD GIBBS, 1822–1908 (U.S.A.)
FRANKLAND, 1825–1899	GAY-LUSSAC, 1778–1850	KOPP, 1817–1892	LE BEL
GRAHAM, 1804–1869	GERHARDT, 1816–1856	LIEBIG, 1803–1873	MENDELÉJEFF, 1834 – 1907 (Rus.)
NEWLANDS, 1838–1898	LAURENT, about 1840	LOTHAR MEYER, 1830–1895	SCHEELE, 1742–1786 (Sw. Pomeranian)
PRIESTLEY, 1733–1804	LAVOISIER, 1743–1794	OSTWALD	THOMSEN, 1826–1909 (Den.)
RAMSAY	PASTEUR, 1822–1895	WISLICENUS, 1835–1902	VAN'T HOFF, 1852 – 1911 (Hol.)
WILLIAMSON, 1824–1899	WURTZ, 1817–1884	WÖHLER, 1800–1882	VAN DER WAALS (Hol.)

Borelli, Robert Hooke (1635–1703), with his vibratory theory of matter, Huygens, Euler (1707–1783), Lagrange. Merz calls attention to the importance of the French school of applied or technical mechanics, represented by men like Monge, the elder Carnot, Navier, and Poncelet. As he points out, we may distinguish various departments of "Mechanics"—astronomical (Laplace, Poincaré); physical (English mathematical physicists, **Kirchhoff, Helmholtz, Hertz**); geometrical (Poinsot, Charles, Ball); and technical (Watt, Poncelet, Rankine).

CONSERVATION OF ENERGY.—One of the great scientific generalisations which has become part of the intellectual framework of all educated men is the doctrine of the Conservation of Energy, that "The total energy of any material system is a quantity which can neither be increased nor diminished by any action between the parts of the system, though it may be transformed into any of the forms of which energy is susceptible" (Clerk Maxwell). It has been called by Roscoe "the greatest and most far-reaching scientific principle of modern times." There has been keen discussion over the merits of the various contributions which led to its being formulated, and some go back to Huygens and the Bernoullis. It is especially associated with the names of Joule, **Helmholtz,** Thomson, **Clausius, Mohr.** Just as the doctrine of the conservation of matter is connected with the perfecting of the balance, so the doctrine of the conservation of energy is connected with the determination of the mechanical equivalent of heat, notably with the experiments of Rumford (1753–1814) and Davy leading on to those of Joule. In 1843 Joule showed that so much work, under the same conditions, always corresponds to so much heat, and so much heat to so much work. In 1847 Helmholtz published his famous essay, *Die Erhaltung der Kraft*—the persistence of force—in which he sought to show that this great conclusion follows from Newton's third law of motion.

To the doctrine of conservation must be added as a

corollary the principle of the dissipation or degradation of energy, first clearly stated by Sir William Thomson (Lord Kelvin) in 1852. In Professor Tait's words, it means that "as every operation going on in nature involves a transformation of energy, and every transformation involves a certain amount of degradation (degraded energy meaning energy less capable of being transformed than before), energy is becoming less and less transformable."

HEAT AS A MODE OF MOTION.—The doctrine of the conservation of energy is wrapped up with experiments on heat and its recognition as a mode of motion. The idea was older than Newton's *Principia*, but the proof of it was Joule's. In 1798 Count Rumford (an American) had almost proved this by his famous cannon-boring experiment at Munich, and in the following year Sir Humphrey Davy was close on the track. He devised a clockwork for rubbing two pieces of ice together in the vacuum of an air-pump, and observed that part of the ice was melted although the temperature of the receiver was kept below freezing-point. Other approaches were made by Séguin and **Mayer,** and most important of all was the work of Carnot (1796–1832), who introduced the two fruitful ideas of a cycle of operations and a reversible engine. But the actual achievement of convincing measurements was due, about 1843, to Colding of Copenhagen and Joule of Manchester, whom Professor Tait speaks of as "the true modern originators and experimental demonstrators of the conservation of energy in its generality."

Among the investigators of heat may be mentioned: Black, Rumford, Cavendish, Davy, Laplace, Fourier, Carnot, Clapeyron, Mohr, Mayer, Liebig, Joule, Helmholtz, Colding, James Thomson, Clausius, William Thomson (Kelvin), Tait, Rankine, Balfour Stewart, Regnault.

KINETIC THEORY OF GASES.—Dalton had pictured a gas as made up of particles flying about and diffusing in all directions, and Graham had shown that the relative rates of diffusion of two gases are inversely proportional to the

square roots of their densities. From such beginnings and from suggestions by D. Bernoulli and Herepath was developed the magnificent generalisation known as the kinetic theory of gases, which harmonised numerous facts regarding the behaviour of bodies in a gaseous state. The decisive step was probably that taken by Joule in 1851 when he calculated the mean translational velocity of the particles of a gas, showing that the molecules of hydrogen, for instance, strike the bounding surface at a rate far exceeding that of a cannon ball. To the development of the theory many contributed, notably **Krönig, Clausius,** Clerk Maxwell, **Boltzmann, O. E. Meyer,** Van der Waals. Here again German investigators did their full share.

THEORY OF LIGHT.—According to the old corpuscular or emission theory of light, a luminous body gives off minute elastic bodies, which travel at great speed in straight lines in all directions. This gave place to the undulatory theory of light, which was suggested by Descartes and Hooke, formulated by the genius of Huygens (1678), and established by Thomas Young (1773–1829), Fresnel, Arago, Joule, Foucault, and Fizeau—the central idea being that light consists of vibrations in an all-pervading elastic ether, with the vibrations at right angles to the direction of propagation. It will be noticed that Frenchmen played an important part in the development of this kind of investigation, and the tradition has been sustained in the work of Cornu, Becquerel, and the Curies. But a further step was due to the genius of Faraday and to Clerk Maxwell in his footsteps, who showed that light-radiation and electromagnetic radiations are alike due to rhythmical disturbances in the ether—one of the most unifying ideas of modern science. The researches of Stokes are here of the first importance. Among others who contributed notably to the science of light and optics may be mentioned Huygens, Euler, Römer, Doppler, Bradley, Brewster, Biot, Arago, Malus (polarisation, 1810), Cauchy, Poisson, Foucault (1850, velocity in different media), Stokes, **Bessel, Sellmeier.**

In his Rede Lecture on "The Wave Theory of Light: Its Influence on Modern Physics," Professor A. Cornu referred generously to the next great step in the history: "But the abstract theories of natural phenomena are nothing without the control of experiment. The theory of Maxwell was submitted to proof, and the success surpassed all expectation. . . . A young German physicist, **Heinrich Hertz** (1857–1894), prematurely lost to science, starting from the beautiful analysis of oscillatory discharges by Helmholtz and Kelvin, so perfectly produced electric and electromagnetic waves, that these waves possess all the properties of luminous waves; the only distinguishing peculiarity being that their vibrations are less rapid than those of light. It follows that one can reproduce with electric discharges the most delicate experiments of modern optics—reflection, refraction, diffraction, polarisation, &c. . . ." Thus it is in part to a German investigator, Hertz, that we owe our modern interpretation of light as an electrical phenomenon. What he did was in the main to give experimental confirmation of the Faraday-Maxwell theory, and it should be noted that Oliver Lodge and G. F. Fitzgerald were about the same time within sight of the same discovery. This was, of course, the basis of Marconi's wireless telegraphy.

OTHER RADIATIONS.—To some extent it was by a logical argument from analogy that various workers were led to the discovery of other radiations—some of which have very remarkable properties. Different nationalities are well represented—France by the Uranium radiations discovered by Becquerel; Germany by **Röntgen** rays; Hungary by Lenard rays; Britain by the work of Crookes.

ELECTRICITY.—It was in the last quarter of the eighteenth century that Galvani called attention to the electrical changes occurring in the contracting muscles of the frog's leg, and in the last year of the century that his fellow-countryman, Volta, showed that electricity might be produced by the contact of two metals. But it is of the nine-

teenth century that the study of electricity is characteristic. It was initiated by Oersted (1777–1851) and Ampère; its dynamical foundations were laid by the genius of Faraday; it found mathematical formulation in the work of Kelvin; it was further developed by Clerk Maxwell, Helmholtz, Fitzgerald, Lodge, J. J. Thomson, and many others. Parallel to some of Faraday's work on magneto-electricity and induction currents was the work of the American Joseph Henry (1799–1878). Among the many contributions we must mention the work of **Ohm** (1789–1854), whose simple appliances can be seen in the Museum at Munich. He measured electric resistance and the like, following a line indicated by Cavendish in 1781, and supplied the basis, at least, for our whole system of electrical measurements. One thinks also of **Weber**, **R. Kohlrausch**, Fitzgerald, **Plücker** (electric and magnetic properties of gases and crystals, from 1847), Lodge, Poynting, Heaviside, **Boltzmann**.

NATURE OF MATTER.—The old idea of matter as consisting of perfectly hard atoms with empty spaces between, has given place to something subtler. Boscovich and Faraday replaced the perfectly hard atom by point-centres of repulsive and attractive forces, Kelvin by vortices in a perfect fluid ether, Larmor by loci of strain in the ether, Lodge by individualisations of the ether, and so on. "As we watch," Poynting said, "the weaving of the garment of Nature, we resolve it in imagination into threads of ether spangled over with beads of matter. We look still closer, and the beads of matter vanish; they are mere knots and loops in the threads of ether." Among the other contributors to the theory of matter besides those mentioned, we should notice Maxwell, Cauchy, J. J. Thomson. Among those who have studied the constitution of matter and the theory of the ether may be mentioned—Kelvin, Tait, Larmor, **Helmholtz**, Lodge, Rankine, **Neumann**, Fitzgerald, Johnstone Stoney, **Drude**, McCullagh, J. J. Thomson, Lorentz, **Wiechert**, **Wien**, Zeemann.

GREAT REPRESENTATIVES OF PHYSICAL SCIENCE

BRITAIN	FRANCE	GERMANY	OTHER COUNTRIES
JOULE, 1818-1889	AMPÈRE, 1775-1836	BOLTZMANN	TYCHO BRAHE, 1546 - 1601 (Den.)
FARADAY, 1791-1867	BECQUEREL, 1852-1908	BUNSEN, 1791-1860	COLDING (Den.)
FITZGERALD, 1851-1901	SADI CARNOT, 1796-1832	CLAUSIUS, 1822-1888	COPERNICUS, 1473 - 1543 (Pol.)
KELVIN, 1824-1907	COULOMB, 1736-1806	GAUSS, 1777-1855	GALILEO, 1564-1642 (Ital.)
CLERK MAXWELL, 1831-1879	ST. CLAIRE DEVILLE, 1818-1881	HELMHOLTZ, 1821-1894	WILLARD GIBBS, 1822-1908 (U.S.A.)
NEWTON, 1642-1727	FOUCAULT, 1819-1868	HERTZ, 1857-1894	HENRY, 1799-1878 (U.S.A.)
RAYLEIGH	FOURIER, 1768-1830	KIRCHHOFF, 1824-1887	HUYGENS, 1629-1695 (Hol.)
RUTHERFORD	FRESNEL, 1788-1827	MAYER, 1814-1878	H. A. LORENTZ (Hol.)
STOKES, 1819-1903	GAY-LUSSAC, 1788-1850	MOHR, 1806-1879	MICHELSON (U.S.A.)
TAIT, 1831-1901	MARIOTTE, 1620-1684	F. E. NEUMANN, 1798-1895	ROWLAND, 1848-1901 (U.S.A.)
J. J. THOMSON	POISSON, 1781-1840	OHM, 1787-1854	RUMFORD, 1753-1814 (U.S.A.)
YOUNG, 1773-1829	SEGUIN, about 1800	W. E. WEBER, 1804-1891	VOLTA (Ital.)

D. MATHEMATICS

Two notes already made must be emphasized here. The first is that the greatest names in the higher reaches of science may be quite unfamiliar to the man in the street or even to the general reader, unless some practical application or the like happens to have brought them into public notice. Thus, to take three names, beginning with the same letter, British, French, and German respectively—Green, Galois, and Gauss, they stand for mathematical achievements of the very highest order, but none of them can be said to be familiar, unless perhaps the last. The second note is this, that mathematical thought is in its quality so much by itself that the less outsiders say of it the better. A perusal of Merz's History and of various books like Poincaré's *Foundations of Science* has led to the following comparative list (see page 142).

E. ASTRONOMY

Astronomy, which is usually ranked as the oldest of the concrete sciences, exhibits three main forms of activity: (*a*) observation and description, (*b*) analysis and generalisation, and (*c*) deductive interpretation which looks forward in prophecy and backward in evolutionary history. There has been progress from (*a*) to (*b*) and from (*b*) to (*c*), but investigation continues on each of the three lines.

The various astronomical systems—Ptolemaic, Copernican, Kepplerian, Newtonian, &c.—express attempts at generalisation based on analysis. Copernicus (1473–1543), **Keppler** (1571–1630), Galileo Galilei (1564–1642), and Newton (1642–1727) laid the foundations. Newton's statement of the Gravitation Law in 1687 has been called the foundation of the astronomical view of nature, but it would be more accurate to go back to Galileo. No sketch of British astronomy could possibly leave out Newton, and in think-

GREAT MATHEMATICIANS

BRITAIN

BOOLE, 1815–1864
CAYLEY, 1821–1895

DE MORGAN, 1806–1871

GREEN, 1793–1841
HAMILTON, 1805–1865
KELVIN, 1824–1907
MACCULLAGH, 1809–1847
MACLAURIN, 1698–1746
CLERK MAXWELL, 1831–1874
NEWTON, 1642–1727

SALMON, 1819–1904
SYLVESTER, 1814–1879

FRANCE

CAUCHY, 1789–1857
DESCARTES, 1596–1650

FERMAT, 1601–1665

FOURIER, 1768–1830
GALOIS, 1811–1830
LAGRANGE, 1736–1833
LAPLACE, 1749–1827
LEGENDRE, 1752–1833
LEVERRIER, 1811–1877

MONGE, 1746–1818

PASCAL, 1623–1662
POINCARÉ

GERMANY

CANTOR
DEDEKIND

P. DU BOIS-REYMOND

GAUSS, 1777–1855
GRASSMANN
HELMHOLTZ, 1821–1894
KLEIN
LEIBNIZ, 1646–1716
C. G. NEUMANN, b. 1832

PLÜCKER, 1801–1868

RIEMANN, 1826–1866
WEIERSTRASS

OTHER COUNTRIES

ABEL, 1802–1829 (Nor.)
J. BERNOULLI, 1654–1705 (Switz.)
D. BERNOULLI, 1700–1782 (Switz.)
W. BOLYAI, 1775–1856 (Pol.)
J. BOLYAI, 1802–1860 (Pol.)
EULER, 1707–1783 (Switz.)
HUYGENS, 1629–1695 (Hol.)
JACOBI, 1804–1851 (Jew)
SOPHUS LIE, 1842–1899 (Nor.)
LOBACHEVSKI, 1793–1856 (Rus.)
PEANO (Ital.)
VERONESE (Ital.)

ing of Germany we must include Keppler. Assistant for two years to Tycho Brahe, the Danish astronomer, he continued his master's work and formulated the three great laws of the movements of the planets.

A great part of astronomy has consisted in applying the gravitation-formula to the phenomena of the heavens—to such questions as the distance of the sun, the movements of the moon, the courses of the planets, and the paths of comets. On this line of investigation Germany has done her share. Thus Zach and **Olbers** corroborated Piazzi's discovery of Ceres (1801), and Olbers discovered Pallas in 1802. **J. E. Bode** of Berlin formulated a law which aided at least in the discovery of other minor planets. The story has been often told how Adams and Leverrier predicted the position of Neptune, and how it was found according to instructions by **Galle** of Berlin and Challis of Cambridge in September, 1846. The kind of work Halley had done in predicting the return of " Halley's Comet " was paralleled in Germany by **Olbers** and **Encke.**

Britain is wont to be proud of **William Herschel** (1738–1822), who extended Newtonian methods to the study of the stars and recognised the occurrence of vast developmental changes in the heavens, new systems being seen in process of formation while others are dying away. But William Herschel was a Hanoverian. Moreover, his work in Britain may be paralleled by that of **Bessel** at Königsberg and by that of the Struves, father and son, at the Russian observatory of Pulkowa. William Herschel's investigations were splendidly continued in Britain and at the Cape by his son John F. W. Herschel (1792–1871). F. W. Bessel (1784–1846) is famous for much, notably for measuring for the first time the distance of a star. By the determination of annual parallax he estimated the distance of 61 Cygni in 1838, and analogous results were immediately afterwards published for α Centauri by Henderson (1839), and for Vega by Struve (1840).

One of the pioneers in that part of astronomy which is

concerned with the physics and chemistry of the heavenly bodies was Professor Alexander Wilson of Glasgow, a man of ingenious mind, who published, in 1774, an interesting study of the sun and its spots. But the blazer of the trail was William Herschel, and he was followed in his study of the sun by Sir John Herschel, Baily, Airy, Arago, Struve, and others. Nor can we forget the German amateur **Heinrich Schwabe** (*d.* 1875) who showed, about 1850, that there was a periodicity in the appearance of sun-spots.

To name all those astronomers and physicists who have concerned themselves with the sun's heat would mean a long list. There were those who measured it—Sir John Herschel, Pouillet, Thomas Young, Langley, Janssen, Le Chatelier, and so on. There were those who discussed the problem of its maintenance—**Mayer,** Thomson and Tait, Tyndall, **Helmholtz,** and others.

The investigation of the physical and chemical nature of the heavenly bodies may be said to have begun with Herschel, especially in his study of nebulæ, but it soon attained to an unexpected development through the invention of spectrum analysis.

Spectrum Analysis.—This method of obtaining from the spectra of sun and stars and comets a knowledge of their chemical composition was especially due to **Kirchhoff** (1824–1887) and **Bunsen** (1811–1899). The fundamental paper was published in 1860, and in it Kirchhoff refers to the previous work of **Fraunhofer** (1787–1826), who discovered the " dark lines " in the sun's spectrum, and on whose tomb there are the appropriate words " Approximavit sidera." There were others besides Fraunhofer whose work Kirchhoff acknowledges as helping towards the new method which Bunsen and he discovered. He speaks of Sir David Brewster, Miller, and Foucault ; and the contributions of Stokes (1850) and Balfour Stewart were also of importance. But the method of spectrum analysis must be associated in particular with Kirchhoff and Bunsen.

If we look into details, beginning with Newton's simple experiment of 1672, when he used a prism to split up a ray of light entering a dark room through a hole bored in the shutter, we find many contributions all tending towards spectrum analysis. Thomas Melvil, Wollaston, Simms, Sir John Herschel, Talbot, William Swan, Angström, and those already mentioned made their contributions, but our impression is that the credit for the method rests none the less with Kirchhoff and Bunsen.

The method has yielded important results in the hands of Angström, Balfour Stewart, Miller, Lockyer, Rowland, and others, and with its extension to the stars the name of Sir William Huggins will always be most honourably associated. From 1870 onwards the splendid work of Huggins was ably continued by **Hermann Vogel** at Potsdam. The record of what this method has accomplished has been called the scientific epic of the nineteenth century, and (to quote Sir William Huggins) it is indeed a triumph of man's mind "to analyse the chemical nature of a far distant body by means of its light alone; to be able to reason about its present state in relation to the past and future; to measure within an English mile or less per second the otherwise invisible motion which it may have towards us or from us; to do more, to make even that which is darkness light, and from vibrations which our organs of sight are powerless to perceive, to evolve a revelation in which we see mirrored some of the stages through which the stars may pass in the slow evolutional progress. . . ."

Of exact observational astronomy with its patient cataloguing and mapping, we cannot profitably say much in a sketch of this sort. We might speak of Bradley's Greenwich observations, the edition of these and extension of them by **Bessel**, the monumental *Mensuræ Micrometricæ* of F. G. W. Struve (1793–1864), the great *Bonn Durchmusterung* compiled (1859–1862) under the supervision of Argelander, and so on down to the Harvard catalogue by Pickering, and

again the usual result would emerge that German workers have done their share.

There was something of a new departure in the development of stellar photography, which has meant seeing the invisible, and in the improvement of photometric methods of estimating degrees of star brightness. What intensifying of observation is implied in the study of Mars by Lowell and others, and in the mappings of the moon by Lohrmann and Schmidt, Beer and Mädler, Nasmyth and Carpenter, Neison and Secchi. And did not this careful scrutiny of the moon's face practically begin with Schröter's *Selenotopographische Fragmente* (1791–1802) ?

Evolution Idea in Astronomy.—Though the conception of organic evolution (with its struggle for existence, its variation and selection, its elimination and survival, and final replacement of one type by another) does not accurately apply to the heavens above, no one doubts that there has been a process of becoming. Perhaps development would be a fitter term by which to denote the establishment of solar systems and the differentiation of worlds. In any case, the evolutionary way of looking at things has come to stay in astronomy as in other sciences, and our question is: To whom are our thanks due ?

It was in 1755 that **Kant** (1724–1804) published his *General Natural History and Theory of the Heavens,* avowedly based on Newton's *Principia.* More important, however, was the *Nebular Hypothesis* of Laplace (1796). Though the details of this theory are no longer acceptable, the general idea remains that the solar system has taken form from a diffused mass something like the nebulæ seen in the heavens. Among those who have contributed to the theory of the evolution of planetary systems we may note **Helmholtz,** Kelvin, Clerk Maxwell, Faye, Sir Norman Lockyer, Sir George H. Darwin, and Professor Chamberlain of Chicago. Merz calls attention to the early speculations of Thomas Wright of Durham, which influenced Kant, of William Herschel, and of the mathematician J. H. Lambert.

F. GEOLOGY

There was little scientific geology before 1785, when James Hutton communicated to the Royal Society of Edinburgh the first outlines of his *Theory of the Earth*. But Sir Archibald Geikie in his *Founders of Geology* records the work of some pioneers. Jean Étienne Guettard (1715–1786) was the first to make geological maps, to recognise the extinct volcanoes of Central France, and to see the value of organic remains as geological monuments. Nicholas Desmarest (1725–1815) studied the volcanic rocks of Auvergne. **Peter Simon Pallas** (1741–1811) discovered the remains of mammoth and other extinct mammals in Siberia and inquired into the making of mountains. H. B. de Saussure (1740–1799), who seems to have been the first to adopt the terms geology and geologist, began the scientific attack on the Alps. **Werner** broke ground in the classification of minerals and was an influential teacher. We must not forget the prophetic idea of **Leibniz's** inquiries into the history of the earth, expressed in his *Protogæa*, posthumously published in 1749.

Hutton's work was fundamental. He had the idea of the development of the earth, of the potency of little causes, long continuing, and he gave a deathblow to " catastrophic " theories. He strikes a clear scientific note in a famous sentence: " No powers are to be employed that are not natural to the globe, no action to be admitted except those of which we know the principle, and no extraordinary events to be alleged to explain a common appearance." His work was strengthened by that of his pupil John Playfair, but progress was hindered by a long drawn-out controversy between Hutton's followers—the Plutonists—who emphasized the importance of subterranean heat, and Werner's followers—the Neptunists—who were as sure that the agency of water was all important. Sir James Hall, in supporting Hutton, may be said to have made the first

experiments in geology, for he fused basalt and chalk, and showed with layers of clay how the foldings of strata might arise.

One of the great dates in the history of science is 1815, when William Smith (1769–1839) published his Geological Map of England, embodying his momentous conclusion that the stratified rocks occur in definite sequence and that each well-marked group can be recognised and tracked by its characteristic fossils. "No single discovery," says Sir Archibald Geikie, "has ever had a more momentous and far-reaching influence on the progress of a science than that law of organic succession which Smith established."

Lyell (1797–1875) continued the work of Hutton and gave to what is called uniformitarian geology its finest and, it must be admitted, an extreme expression. He showed how agencies now in operation might account for the stratified rocks, but he refused to entertain the idea of evolution and severed his geology from cosmogony.

To whom, then, is due the modern evolutionary geology which regards the earth as the long result of time, as the outcome of gradual development from a molten state, and also seeks to discover how the formative factors may have differed qualitatively and quantitatively from age to age?

It seems likely that various inquiries conspired to bring about the transition from Uniformitarian to Evolutionist Geology, such as the cosmological speculations of **Kant** and Laplace; the physicists' study of the age of the Earth, *e.g.* Sir William Thomson (Lord Kelvin), 1862; the study of Ice Ages, from Louis Agassiz to James Geikie; the influence of palæontology, which began to disclose in the successive series of fossils a progressive emergence of higher and higher forms. But one man may be named who made the transition impressive, **Edouard Suess** (1831–1914). He was born in London but his father came from Saxony. Most of his life was spent in Austria. An indication of his genius in reading the development of land-forms was given in 1875 in a little book on the Alps. His great

work *Der Antlitz der Erde* was published in 1897. In the preface to the French translation of this geological masterpiece, Marcel Bertrand writes:

"The creation of a science, like that of a world, demands more than a day; but when our successors come to write the history of our science, they will say, I am persuaded, that the work of Suess marks the end of the first day, when light first shone." This is exuberant praise, for there was much sound geology before Suess, but it is interesting.

Although Alexander von Humboldt, Leopold von Buch, and some other Germans interested themselves in the study of volcanoes, glaciation, and the like, there do not seem to have been many important contributions except in one department, that of petrography, where the names of **Zirkel** and **Rosenbusch** stand out pre-eminently. They may be called the founders of modern petrography, and it is interesting to note that what started Zirkel was his acquaintance with H. C. Sorby of Sheffield, who had in 1850 recognised the importance of microscopic sections of rocks.

GEOGRAPHY.—As regards the young synoptic science of geography—which is a correlation of many sciences for a particular purpose—the historical fact seems unquestionably to be that Germany has led. One of the founders of scientific geography was **Alexander von Humboldt** (1769–1859), and that not merely through his explorations, or his method of representing the relief of a country by cross sections, or his invention of isotherms, but because he saw things always in their inter-relations. Dr. H. J. Mackinder writes: "Humboldt's *Essai politique sur la Nouvelle-Espagne*, published in 1809, must take high rank among the efforts of the new geography as the first complete description of a land with the aid of the modern methods. Here, for the first time, we have an exhaustive attempt to relate causally relief, climate, vegetation, fauna, and the various human activities." For that is geography.

When we think of the great geographers we recall **Karl Ritter** of Berlin (1779–1859), **Ratzel, von Richthofen, Penck,** Le Play, Reclus, de Lapparent, and Davis.

CONCLUSION.—In the history of geological science it does not seem that many contributions of the first rank can be referred to German workers, except, indeed, in the field of petrography where their position is pre-eminent; and except the work of Suess which is unsurpassed. In the development of geographical science German influence has been paramount till within recent years.

SCIENCE IN GENERAL

Foremost among German investigators whose influence was rather on natural knowledge as a whole than on any particular science must be ranked **Alexander von Humboldt** (1769–1859). Geologist, botanist, physiologist, geographer, he kept before him for half a century the ideal, towards the realisation of which his *Cosmos* was devoted, of seeing Nature as a whole. He made a practical synthesis of the science of his time. His personality, his extensive travels, his style, his wide interests gave him enormous influence which he exerted liberally in the cause of education and enlightenment. He caused natural science to be appreciated in a new degree, and gained for it in Germany a dominance in thought and practical counsel which it has not even yet been granted in Britain. He infused into the incipient University system of Germany something of the French scientific spirit, and Merz reminds us that he was "the man who organised that 'scientific conspiracy of nations' which is peculiar to our (nineteenth) century, and without which the study of geography, meteorology, astronomy, the phenomena of tides and magnetic disturbances—called by him magnetic storms—could not effectually be carried on."

We cannot speak of the one brother without the other, and it is indeed difficult to say which was the greater,

Wilhelm von Humboldt is especially remembered for his educational enlightenment which found expression in the foundation of the University of Berlin, in 1809 (at a time, it should be remembered, when the resources of Prussia had been war-strained to the uttermost).

CONCLUSIONS

SCIENCE OWES MUCH OF ITS DEVELOPMENT TO GERMAN INVESTIGATORS.—What we have been able to do in our historical survey is only to illustrate, but the general conclusion seems secure, that it is as inaccurate as it is ungrateful to try to belittle the debt of science to German investigators. In some departments, as in Geology and Natural Philosophy, the British contributions have been of greater eminence; in others, as in Mathematics and Optics, the palm is with France; and so on; but in many departments Germany has contributed a truly splendid share. As we have said in our introductory notes, there are several different kinds of discoverers, and perhaps it is the case that Germany has not had many of those who by some flash of insight have made a whole subject new. But there have not been many of this type in *any* nationality. Another important consideration is that many of the investigators who come nearest genius are very careless of self-advertisement and move at altitudes which are inaccessible to the man in the street. How few in Britain or France know even the names of George Green and Evariste Galois! There is a characteristic story of **Mohr**, who seems to have been a genius, who did not even know of the publication of his paper—containing, probably, the first formulation (1837) of the principle of the conservation of energy. Another hardly known German genius was **Plücker**, who studied the electric properties of gases and crystals. The supreme title must surely be given to **Leibniz, Gauss, Goethe, Helmholtz, and Johannes Müller.**

Within recent months the charge has been bandied

about that German investigators get hold of the ideas of others and work them out, so that the credit passes from the originator to the elaborator. But this allegation requires to be scrutinised with care, and should not be allowed to pass into popular currency. A few cases of serious plagiarism in science are known, and they are not confined to Germany! Besides, one knows that similar ideas are often in the air about the same time, and that "great minds think alike." If an idea is lying like a non-germinating seed, some credit is due to the man who makes it develop, though he should, of course, be prompt to point out that the seed did not come from his tree. It shows the beginning of a dangerous arrogance to speak as if all the original and fertile ideas saw the light in Britain, France, and America, and as if German investigators were merely hodmen of prodigious industry. This is an unworthy travesty of the facts. It is easy to mention cases where British investigators have wisely taken a hint from new ideas and new methods arising elsewhere; but, of course, it will be difficult to find cases where full credit has not been given to the originator. Thus one of Professor Bateson's valuable contributions includes much of his own fundamentally-important work on inheritance under the title *Mendel's Principles of Heredity*. Professor Punnett incorporates some of his own work in a book with the title *Mendelism*, just as Wallace called one of his best books *Darwinism*. We know how Ferrier in his early work on cerebral localisation took a hint from the experiments of **Fritsch** and **Hitzig**. We know that Young and Fresnel were almost equally great. We know that Frankland and **Kolbe** worked together.

PROBABLE FALLACY OF USING THE HISTORY OF SCIENCE AS AN INDEX OF NATIONAL QUALITIES.—Modern civilised nations differ *organically*, that is to say, in their hereditary qualities of body and mind. But most of them are very heterogeneous, aggregates or integrates of racial groups which do not blend, even with intermarriage. Thus the

Celtic strain in the Hebrides is perhaps as different from the East Anglian as French from German. And just as one countryside is all Tertiary and another mainly Primary, so the populations are here plainly Victorian and there as obviously Arthurian.

Modern civilised nations differ *traditionally;* and when Human Nature comes to be studied as scientifically as Animal Nature or as Inorganic Nature, it may be found possible to appraise this tradition-factor in relation to the constitutional differences. But we are far from this at present, and it is extremely difficult often to suggest why certain kinds of studies are prosecuted with zest in one country and with an effort in another. There is a tradition operative in such matters.

But, thirdly, modern civilised nations differ *environmentally*—that is to say, in geographical position in the widest sense of the term. This means very great differences in opportunities (seafaring, for instance); and every biologist is aware that whatever be the treasure of hereditary capacity, the expression of this depends on the available liberating stimuli. We do not expect a development of metallurgy in a country with no mines.

If there is truth in these three propositions, we must recognise the probable fallacy of using the history of science as an index of national or racial qualities.

SCIENTIFIC ABILITY NOT CORRELATED WITH NATIONALITY.—This is an impression, not a statistical conclusion, but there are many facts behind it. Our foregoing survey—sketchy as it had to be—certainly suggests that each of the leading civilised nations has its fair share of scientific discoveries of first-rate importance. If one knew enough as to details of *race—e.g.* if one could put by themselves all of Jewish strain, or could trace the migrations of gifted stock, say; from North Italy into France, Germany, Switzerland, and Austria, one's impression might change. But neither for olden times nor for our own can we find convincing evidence for correlating special fertility in scientific dis-

covery with any nationality. The discovering spirit is individual. It means a particular alertness, fineness, freshness, eagerness—born, not made. It is sacred and inestimable, and it is a matter for lasting regret when it ends with its possessor and is not incorporated into the natural inheritance of the race.

Our impression that the rare spirit of the discoverer moveth where it listeth, no one being able to tell whence it cometh or whither it goeth, is shared by others who have interested themselves in the history of science. Thus, Sir Michael Foster writes: "While we have been following the gradual enlightenment of the physiological world we have seen how the spot of light which was the centre of illumination shifted from place to place, and shone now in one University, now in another. We have seen it bursting out brilliantly at Padua in Vesalius, less brightly in Fabricius; it appeared meteor-like in Switzerland in Paracelsus; then it moved to London and shone in Harvey. Anon it burst out in the northern countries in van Helmont at Brussels, in Stensen at Copenhagen. It flitted back to Italy, to Borelli in Pisa, to Malpighi in Bologna, and once more returned to the north to Sylvius in Leyden, and to others." If he had been writing of the nineteenth century, he would have mentioned centres of illumination in France and Germany.

NOBEL PRIZES.—It may be of interest to take note of the Nobel awards in chemistry and physics.

In Chemistry:

1901. Van't Hoff (H.).
1902. **Fischer.**
1903. Arrhenius (Sw.).
1904. Ramsay (Br.).
1905. **Baeyer.**
1906. Moissan (F.).
1907. **Buchner.**
1908. Rutherford (Br.).

1909. **Ostwald.**
1910. M. Curie (M. Sklodowsky, Pol.).
1912. Grignard and Sabatier (F.).
1913. Werner (Swiss).

In Physics:

1901. **Röntgen.**
1902. Lorentz and Zeeman (H.).
1903. Becquerel, P. Curie, M. Curie (F.).
1904. Rayleigh (Br.).
1905. Lenard (Hungarian).
1906. J. J. Thomson (Br.).
1907. Michelson (U.S.A.).
1908. Lippmann (F.).
1909. Marconi (It.) and F. Braun.
1910. Van der Waals (H.).
1911. **Wien.**
1912. Dalen (Swiss).
1913. Onnes (H.).

CHARACTERISTICS OF GERMAN SCIENCE.—While we do not believe that the finer forms of scientific discovery are correlated with nationality, we recognise certain distinctive features in the scientific industry of different countries. Thus British work seems to us, not unnaturally, to be marked by its sanity, its sound perspective, its self-criticism, and its evidence of having been done for its own sake. Thus French work seems to us to be marked by its lucidity, its admirable presentation, its light touch, and its daring originality. Thus German investigators impress us with their productivity, their thoroughness, their learning, their methodic orderliness, their careful technique, and their convinced belief in the value of science as a whole and of their own contributions in particular. We distrust vague generalisations, but we have a strong impression that the reading public for concrete science is *enormously* greater in Germany than in Britain, and that there is a stronger faith

(which we believe to be warranted) in what science can do for the amelioration of human life. It is also our impression that the interest in the philosophical aspects of science which used to be characteristic of Germany has greatly waned in the last quarter of a century, and is probably not so strong now in Germany as it is in France, Italy, or even Britain.

There has been during that period in all countries a general raising of the standard of laboratories, museums, demonstration facilities, and so on, in which America has played a prominent part, but we are strongly convinced that about 1885 a student who wished to specialise was able to get in Germany a pleasant place to work in, abundant material to work at, a high development of technical methods, remarkable library facilities, and the most generous expert counsel, and to get it more readily than anywhere else in the world.

In one respect, however—in the matter of text-books for students—Germany was *until recent years* far behind France and Britain. Thus in regard to mathematical and physical science, Merz notes that while there were many great investigators in Germany before the middle of the nineteenth century—such as Euler (Swiss), Gauss, Jacobi (Jew), the greater part of the higher German school literature in mathematics and physics was French or modelled on French ideas. "The only great popular authorities which did not belong to France were Berzelius and Graham in chemistry, and Euler in mathematics. As late as 1860 hardly any text-book existed in Germany on theoretical and mathematical portions of physics." Perhaps the first great one was Kirchhoff's *Lectures on Mechanics* (1877—ten years after the first edition of "Thomson and Tait"). Soon afterwards came the clear and deep writings of Helmholtz. Merz notes that before Helmholtz, the only German physicists who condescended to write popularly were Bessel, Humboldt, and Liebig.

INDUSTRY.—Compared with French and British in-

vestigators, the Germans are superior in industry or scientific productivity. The output of a man like Gauss, or Johannes Müller, or Kölliker, is amazing. Perhaps there are several reasons for this characteristic. (1) More than in other countries it has been the tradition in Germany that the investigator should stick to his business, and should not dissipate his energies in civic or social affairs, in politics, or in over-much teaching. (2) Till 1875, at least, the men of science and the learned generally lived with a praiseworthy simplicity and often on small salaries. It was understood that the pursuit of anything but knowledge (and fame) had been given up from the start. Doubtless there were instances of keen rivalry in productivity with an eye to promotion, especially among "Privat-Dozenten," whose highest ambition it was to become "Professor," but of the majority the impression that strangers got was one of devotion. (3) To that may be added a temperamental quality, accentuated by habit, of strenuous persistence, now sinking into a certain stolidity, again rising into heroic patience, and on an average presenting that quality to which Darwin referred in himself when he said, "It's dogged that does it."

THOROUGHNESS.—After one has read, say, ten thousand scientific papers coming from different nationalities, one begins to form an impression of distinctive features in each case. One of these impressions is of the thoroughness of German work. It is often excessively tedious—the long historical introduction, the record of personal observations, the critical discussion of the results of other investigators, the *Allgemeine Betrachtungen* and the *Zusammenfassung*; and often, of course, it is but a mouse that the mountain brings forth! But it is usually an irrefutable mouse that has come to stay. It is easy to find in other countries—*e.g.* France, Britain, or America—morphological papers, for instance, which are just as thorough as those of the approved German type in the sense that their results are well-substantiated, but it is not easy to find many which are so

meticulously detailed, which resolutely refuse to recognise any limit but that of the available analytic methods of the day. In many other nationalities the tendency is not to push detailed description beyond the limit of probable utility. It must be remembered also that the printing of numerous doctorial theses, which have to approximate (not unnaturally) to the type, swells the total annual production of the prolixities to which we have alluded. As one would expect, the papers of some of the masters become terser as their authors age; but there are others who persist to the end in telling you everything. And the difficulty of criticising it is that in a way it is so excellent, for no one can tell what item of news may form the centre of a fresh crystallisation. Perhaps it is best not to criticise at all, for there is nothing so precious as individuality, and the German style of biological paper is certainly not that of most other nations.

Every scientific worker knows that for many years Germany supplied the world with scientific reports or records (*Jahresberichte*) of the progress of investigation. Though this thankless but absolutely necessary task has been in some measure diffused, the service done by German workers in this connection has been very great. We refer to such reports as *Fortschritte der Physik* and *Annalen der Chemie*. Merz, with his usual thoroughness, points out that the first records of this sort were probably those which Delambre and Cuvier prepared at the request of Napoleon, and that the first periodical record was begun in 1821 by the great Swedish chemist Berzelius. He notes: "By far the most important work of reporting and summarising the results of scientific labour has been done by Germany."

THE BEST FEATURES OF GERMAN SCIENCE.—In his appreciation of the scientific spirit in Germany in the nineteenth century, Merz lays emphasis on the following features: the number and efficiency of the universities, and the way in which these have devoted themselves to

teaching *research;* to their early and liberal development of laboratories and technical equipment; to the large number of investigators of the highest distinction who have worked apart from universities or institutes (men like Leibniz, Euler, Humboldt); to the breadth of view and to the idealistic temper which has been characteristic of German men of science. "The pursuit of truth and the acquisition of knowledge for its own sake, as an ennobling and worthy occupation, has, during a large portion of our century, been the life-work of professors and students alike in the German universities. In the biographies of many of them we meet with that self-denial and elevation of spirit which is the true characteristic of every unselfish human effort. In perusing these records of high aspirations, arising frequently amid disheartening surroundings, these stories of privations cheerfully endured, of devotion to an ideal cause, glowing with all the fervour of a religious duty, we gain a similar impression to that which contemplation of the Classical period of Greek art or the early Renaissance produces on our mind.

"Once, at least, has science, the pursuit of pure truth and knowledge, been able to raise a large portion of mankind out of the lower region of earthly existence into an ideal atmosphere, and to furnish an additional proof of the belief that there, and not here below, lies our true home. We may perhaps have to admit with regret that this phase is passing away under the influence of the utilitarian demands of the present day; we may be forced to think that another—and, we trust, not a lower—ideal is held up before our eyes for this and the coming age. But no really unselfish effort can perish, and whatever the duty of the future may be, it will have to count among the greatest bequests of the immediate past that high and broad ideal of science which the life of the German universities has traced in clear and indestructible outlines."

This is nobly said by one who has the admiration and esteem of all interested in the history of science and philo-

sophy, whose erudition, fair-mindedness, and grasp of essentials cannot fail to win the profound respect of all readers of his *History of European Thought in the Nineteenth Century*. With what Dr. Merz says, the impressions based on our own experience of German universities and German investigators are in general agreement, and we adhere to them in spite of all that has happened. For we cannot allow what has been done to-day to affect our judgment of scientific achievements in the past.

IV

GERMAN LITERATURE

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Classical German literature means, in the wide sense of the word, the century of Lessing, Goethe, and Schiller. This is the "great" age, and the first thing that surprises the student of German culture is that it came so late. Long after Shakespeare and Milton in England and Corneille and Molière in France were dead, there was still no writer of universal interest in Germany. Martin Luther is the only figure in the sixteenth century, and his work was to a greater extent religious and political than literary, while in the seventeenth there is none among the many, as Opitz, Gerhardt, Gryphius, or Grimmelshausen, who rises above mediocrity. These two centuries are, from the international point of view, a blank. In the one the Reformation seems to have absorbed every interest, in the other the Thirty Years' War shattered the whole fabric of culture, material as well as spiritual. The question inevitably presents itself, Would Germany but for these two upheavals have reached its majority earlier, or must we seek the root of the matter in a certain lack of originality, an inability to start off till other literatures had shown the way? On the one hand, we must remember that German letters do owe a very great deal to France and England, particularly in the eighteenth century, but, on the other, one might point to those charming folk-songs, composed and transmitted orally in the fourteenth and fifteenth centuries, which bespeak a native gift for lyrical composition. Just a century before, also, under the stimulus of French chivalry, the knights and wandering singers of Southern Germany had produced a literature which re-

vealed, in the *Nibelungenlied*, *Parzival*, and in the lyrics of Walther von der Vogelweide, profundity, taste, and originality. The *Nibelungenlied* is by no means a new *Iliad*. The texts which we possess are swelled by interpolations, and many absolutely essential portions are inferior in imagination and versification. But the conception as a whole is magnificent. Mythology, history, and mediæval chivalry are wonderfully blended. It is, indeed, "the crown of the popular poetry of the Middle Ages," but, like everything else belonging to that time, it passed into oblivion during the unliterary ages of the sixteenth and seventeenth centuries. The new conditions had caused a violent interruption of the natural development, and for that reason the evolution of German literature is very broken and unsteady.

At the beginning of the eighteenth century all the critical foundations had to be laid anew. As one would expect, the first sixty years are marked by feverish eclecticism. The French classical drama and Court poetry, the works of La Fontaine, Voltaire, and Rousseau were exploited as models, while an even stronger influence, and one more akin to the German mind, was exercised by English writers such as Defoe, Pope, Thomson, Milton, Richardson, Shakespeare, by Percy's *Ballads* and Macpherson's *Ossian*. Such a glut of miscellaneous fare would probably have been distasteful, if it had not actually proved fatal, to any other people, but Germany assimilated it rapidly. Imitation led to critical discussion, and the seeds of criticism seem to have fallen on a more fruitful soil than they usually do, for from 1770 onwards literature took a magnificent upward swing. The scholarly, clear-sighted Lessing—almost too clear-seeing, as Novalis said—the impetuous idealist Schiller, and Goethe, one of the four or five great poets of the world, are the names that stand out pre-eminent. Round them are grouped men like Herder, Wieland, Bürger, Hölderlin, Jean Paul, while we must not forget the indispensable pioneers, critics like Gottsched, Bodmer,

and Breitinger, who were short-sighted enough, but did good work in their time, Klopstock, and lesser talents like Gellert, Mendelssohn, and Winckelmann, each of whom added his stone to the stately edifice of German classical art.

A. THE CLASSICAL PERIOD

The year 1748, which saw the appearance of the first three cantos of F. G. Klopstock's *Messias*, is the starting-point in the upward movement. This was at once received as great poetry, and it decided the main question at issue between Gottsched and the Swiss as to the justification and the scope of imagination in literature. Compared with Milton's *Paradise Lost*, Klopstock's epic is vague and dull. But it was so grandiose an effort for its time that it took men by surprise. The serious and sublime view which Klopstock took of the poet's calling was something as valuable as it was new. In his numerous odes, also, he has the merits of the pioneer who introduced new measures and tried new themes. Of his contemporary Wieland little need be said. His romances in verse and prose are now chiefly found on pages yellow with age. By their imitation of French lightness and grace they won the ear of the aristocracy, which otherwise took little interest in German literature. Wieland rendered a greater service to the cause of letters by translating between 1762 and 1766 twenty-two of Shakespeare's plays. Of his original works the only one that is still read is the romantic epic *Oberon*, which Goethe greeted in 1780 in somewhat extravagant terms as "a masterpiece of poetical art."

G. E. Lessing is by far the most vital of these mid-century writers. Authorities like Saintsbury do not take an extravagantly high view of his criticism from an international point of view, but to Germany at that time Lessing rendered invaluable services. He was frequently unfair to the French drama, and his views on lyric poetry, like his own attempts in that line, are very poor indeed. On the other

hand, he wrote well on the Fable and the Epigram, while his *Laokoon*, which sought to define the essential differences between poetry and painting, put an end to the dreary descriptive style so favoured before his time, and emphasized the need of action in poetry. In the dramatic sphere he cast off the fetters of the Unities, and while his views on tragedy cannot be regarded as adequate to-day, he nevertheless supplied his successors with valuable hints on choice and treatment of subject, portrayal of character, and the aim and meaning of drama. Of his own plays *Minna von Barnhelm* is the best. It is good comedy, pithily written. Though it deals with the Seven Years' War, it is still as interesting as it was when it appeared. Lessing knew his Prussians and his Saxons well, and as secretary to General Tauentzien he could draw his military types from direct observation. *Emilia Galotti* is too much a product of the intellect to be good tragedy, apart altogether from the aversion which the Virginia motive now inspires. His last play, *Nathan the Wise*, he called a "dramatic poem," feeling, no doubt, that it would not stand the test of stage representation. It formed the culmination of Lessing's polemical work in theology, and its dramatic form was, to begin with, merely a mask. The plot is improbable and insignificant: it is only the connecting thread for scenes in which the three great religions are shown in contact at the time of the Crusades. The *Leitmotiv* of toleration is kept well to the fore and pressed home by the incorporated story of the three rings from Boccaccio. It is well done, for, despite the dramatic weaknesses and the relatively poor verses, which he somewhat vainly sought to justify, the work is valuable for its wisdom and humour. It is true culture and a pleasing testimony to the broad-minded, earnest, and deeply religious character of its author.

J. G. Herder was, like Lessing, in the first place a stimulator of German literature, and in the second, even more than Lessing, a contributor to European thought. No service could be greater than that which he rendered Goethe

in 1770, by opening his eyes to the poetical qualities of Homer and Shakespeare, the treasures contained in folk-poetry, and the merits of *Ossian*. His critical writings had great influence upon that restless, ambitious and unbalanced period known as the *Sturm und Drang*. This movement, influenced also by Rousseau, was a reaction against the intellectuality of Lessing and his fellow "Aufklärer." It asserted the rights of feeling, imagination, and untrammelled genius. Revolutionaries like Prometheus, Faust, Götz, Karl Moor, were the favourite heroes; writers showed a preference for pathetic or mysterious subjects like Bürger's *Lenore* or Goethe's *Erlking*, and in this as well as in its formlessness the "Storm and Stress" proved itself the parent of Romanticism. Herder's collection of *Volkslieder* (1778–1779), containing specimens of the folk-poetry of various peoples, particularly of England and Scotland, finally established the importance of the folk-song in Germany. Of his own poetical compositions none is important except the *Cid*, in which he translated and unified the ballads which celebrated the Cid Campeador. Apart from poetry, Herder deserves great praise for his *Ideas on the Philosophy of the History of Mankind* (1784–1791). There he regarded history as a progress through culture towards an ideal humanity. He not only emphasized the fact of evolution in history, but also studied its factors and pointed out the essential importance of civilisation as opposed to mere lists of battles and ascensions of thrones. He is thus the first "Kulturhistoriker" and the founder of modern historical research.

Contemporaneous with the *Sturm und Drang* was another literary school known as the *Hain* or "Grove." They desired to continue the high-souled, patriotic tendencies of Klopstock, while the gay humour of Wieland was particularly obnoxious to them. There was a good deal of noisy rodomontade in their propaganda, and not much of their work deserves mention. J. H. Voss' translations of the *Odyssey* and the *Iliad* are still the best in German, while

his idyll *Luise* was the forerunner of *Hermann and Dorothea*. Ludwig Hölty and Matthias Claudius contributed a few songs to the German lyric, while G. A. Bürger, who owed more to Herder than to the "Hain," is the creator of the modern German ballad. In pieces like *The Kaiser and the Abbot* his debt to English influence is very great, but in others, such as his great achievement *Lenore*, all the merits of construction, imagination, and expressive language are his own. *Lenore* and *The Wild Huntsman* were admired and translated by Sir Walter Scott. Bürger's later ballads and his lyrical poetry suffered from the poet's unstable temperament and want of idealism, but they did not merit the harsh criticism which Schiller passed on them in 1791.

A strong classical movement began also to make itself felt about 1780. This was not absolutely new. Horace, Tibullus, Propertius, and Anacreon had influenced the early lyric of the eighteenth century, and the classical drama had come down in an impure form through the French. Lessing's critical views, again, were based on a sound knowledge of the classics. Now, however, it was a question not of this or that classical form, but of ancient art as a whole, and the profoundest insight into this was shown by J. J. Winckelmann, who in his *Thoughts on the Imitation of Greek Works in Painting and Sculpture*, had defined the essence of Greek art as "a noble simplicity and a calm grandeur." This winged word, "edle Einfalt und stille Grösse" exercised a far-reaching influence upon Goethe and Schiller, after the "Storm and Stress" had spent itself. Winckelmann had done valuable excavation work in Italy, and it was largely due to him that Rome became, from 1770 onwards, the Mecca of art for the civilised world. His chief work was the *History of the Art of Antiquity* (1764). Many of the views here expressed are no longer adequate. It has been pointed out, too, that Winckelmann was singularly blind to the beauty of Renaissance art. He was a characteristically German *Schwärmer*, devoted to one object. His interest in the older art completely absorbed all his energy.

But his work is worth remembering, because it was at that time the key to new discoveries in art and to new ideals in creative work.

In Johann Wolfgang von Goethe (1749–1832), the great ideas and movements of the century are reflected as in a mirror. From boyhood he possessed that receptivity which is the best gift of the poet or the scientist. But he had also brilliant gifts of intellect, a strong will, and the lofty impulse to carve out a personal philosophy of his own. His Leipzig work is imitative in content and form. But the French manner fell from him when, in 1770, new possibilities opened up before him, as revealed in the grandeur of Gothic architecture, the naturalness of the old German and English ballads and folk-songs, the majesty of Homer, the wonderful world that Dodd's *Beauties of Shakespeare* presented to him, the enthusiastic nature-love of Rousseau, the vague mystery and charm of *Ossian*. Life, too, was kind to this handsome youth, it gave him friendship and passionate love, it put counsellors by his side like Herder and Merck, who guided his steps with skill and candour. From 1770 onwards Goethe shows the highest gifts of genius, not yet in rounded form, for the "Storm and Stress" formlessness holds him in its spell, but the germs of great work are there, in the Sesenheim songs pregnant with passion and adoration of nature, in the overwrought sentimentalism of *The Sufferings of Young Werther*, or the nonchalant structure but picturesque detail of *Götz von Berlichingen*. *Werther* was the first German novel of world-wide reputation. Its musical prose, the careful workmanship in weaving the web of the plot, the absolute necessity of the tragic close, and the personal interest of the tale still exercise their spell. In that sentimental age the effect was electrical, and no later book of Goethe's received such a welcome. Of the pre-Weimarian work of Goethe nothing approaches the *Urfaust*, that unpublished manuscript which had been written out by Fräulein von Göchhausen and was discovered by Erich Schmidt in 1887. It contains the

conception of Faust as the restless, unhappy, ceaseless striver, dissatisfied with verbal learning, seeking to fathom the real secret of things human and divine, and devoting himself, alas, to magic as a last resource. Here, too, is Gretchen, that so simply and yet so consummately-drawn picture of the deceived and ruined girl, one of the finest conceptions in German literature. But many things were still unrevealed to the young poet—how Faust's idealism was to lead to sin and suffering, or, in dramatic terms, how he was to be introduced to Mephistopheles, what the nature of their bargain was to be, and to what end it would lead. The old Faust books, the Puppet Plays, the stage plays, and Marlowe gave certain indications, but Lessing had before this spurned the tragic ending as morally and artistically unacceptable. Goethe, too, said at a much later time that the full and final plan of *Faust*—and this involves the hero's redemption—had been before his mind from the very first. On that point memory may conceivably have deceived him. Carlyle, Blackie, and most English writers state definitely that Goethe's early Faust succumbs. We cannot go so far as that. A full discussion of the subject would show a preponderance of probability on our side and some insuperable difficulties on the other. In the meantime *Faust* remained a fragment, frequently thought of, but little added to for twenty years, and when Goethe took it up again, it had become so strange and his own character and style had altered so much, that an artistic unity was impossible. It might have been attained if Goethe, as in other works, had simply discarded the original casting, but this was so absolutely bone of his bone, so thoroughly an artistic experience, that only superficial alterations seemed admissible and advisable.

In 1776 Goethe came to Weimar. Wieland and Knebel were already there, Herder followed immediately on Goethe's recommendation, Schiller later, and thus was formed that admirable literary circle which would hardly have been possible at any of the other German courts. Goethe proved

eminently useful to his patron, Karl August, and there was a danger, as Wieland saw, that his numerous duties might mean so much time lost for art. But character, as Goethe said later in *Tasso*, unlike talent, can only be formed in the stream of life. The insight into affairs of state and the intercourse with new types of men and women bore splendid fruit in the clarifying of his views and in the leading conceptions of several of his later works. The passionate friendship for Charlotte von Stein was at once an inspiration and an insidious danger, but the Goethe who hurried away to Italy in 1786 was a clearer, riper, and more equably balanced man than the youth who entered Weimar ten years before. Moreover, in lyrical and ballad poetry, this period is exceptionally fruitful. Poems like *To the Moon*, *The Erlking*, *The Fisher*, and, above all, the philosophical pieces *The Limits of Man*, *The Divine*, *The Song of the Spirits*, touch the highest point that Goethe reached in this sphere. And the initial conception of some of his greatest work, *Iphigenie*, *Tasso*, *Wilhelm Meister*, germinated in these happy and inspiring years.

What Italy meant to Goethe we can read in *The Italian Journey*. He visited all the places of interest, drank in the refreshing beauty and brightness of Italian life, talked with painters and sculptors, continued to sketch as he had done from youth, but now with new models before him, and gradually assimilated, partly with open eyes, partly unconsciously, the classical ideal of beauty. Compare *Iphigenie* with *Götz* or *Clavigo*, and the difference is apparent. *Götz* is the formless expression of genius, *Clavigo* is average stage drama in commonplace language, while *Iphigenie* is both drama and consummate poetry. He has taken the work of Euripides as his basis, but Iphigenie is no longer the cunning, revengeful Greek—she is Goethe's ideal of Teutonic womanhood, strong, true, and steadfast in faith, and it is this strength of hers, and not the *deus ex machina* of Euripides, that leads to her brother's redemption and her own safe return to Greece. Another drama

was worked out in Italy, though not completed till the poet's return to Weimar. George Lewes' verdict, that *Tasso* is " a series of faultless scenes, but no drama," has become classic, though it is not altogether true. On the stage *Tasso* makes a very fair show. There is little outward action, but of mental conflict and activity there is no want. The interest of this work lies in the fact that the soul of a poet has here been pourtrayed by another poet worthy of the task. The conflict is one which Goethe had himself experienced, that between art and life, or, in Tasso's case, the clash of poetry with the ambition to attain worldly fame and rank. As in the previous drama, the beautiful verses form a fitting garment for the noble theme.

The third drama of this period, *Egmont*, deals with a historical subject, and is written in prose. He has taken great freedom with the facts, but it is questionable whether he has made Egmont, with all his amiability and unsuspecting frankness, a convincing tragic hero. Schiller thought not, and though Schiller was not always a reliable critic, he was right on this occasion. Egmont is purblind in his simplicity of soul, and lacking in that grit and strength of mind which a conflict with an adverse fate involves. The character of Klärchen, in her simple innocence and magnificent heroism, is the best thing in the book. It adds one more to the list of female characters which are the joy and charm of Goethe's creative work.

It must have been a strange experience to Goethe that the public which had greeted enthusiastically unripe works like *Werther* and *Götz*, should pay practically no attention to *Tasso*, *Iphigenie*, *Egmont*, or the *Faust* of 1790. Since his return from Italy Goethe must have grown conscious of his loneliness. As he said, with special reference to the verse of *Iphigenie*, no one seemed to thank him for his infinite pains, for the great strides which he had made. He bore the disappointment with complete outward calm, as was his wont, but his reluctance at first to make the closer acquaintance of Schiller, who had earned his fame with

"Storm and Stress" plays, his abandonment of poetry in favour of scientific studies about 1790, his share in the satirical *Xenia* of 1795, and the attempt to get on good terms with his audience in the *Prelude on the Stage*, which he prefixed to *Faust* when he took up that work anew in 1797, show us clearly enough that Goethe had been disappointed and discouraged by a public which preferred the light fare of Kotzebue and Iffland to the serious work of art.

The beginning of the intimate association with Schiller stirred Goethe once more to poetical activity. This famous literary friendship lasted without interruption from 1794 till Schiller's death in 1805. It is unique in the case of two poets of such importance, it was a great gain to both, and it forms a splendid testimony to their forbearance and keenness in the cause of art. Schiller had more gaps to fill in his culture than Goethe, but the latter profited by the stimulus to turn to better account what he had already acquired. The *Xenia*, to which Goethe first turned his hand, are of little moment. He did not need to be a Goethe, and it did not lie in his nature, to chastise the nonentities of the day. From these he turned to the ballad and produced some of his maturest pieces, *The Bride of Corinth*, *The God and the Bajadere*, *The Magician's Apprentice*, and *The Treasure-digger*. He brought to completion his most ambitious novel, *William Meister's Apprenticeship*, which had been started many years before. Recently the earliest sketch of this work, *William Meister's Theatrical Mission*, was discovered. The finished work is superior in style, broader and riper in conception. It follows slowly and by many a meandering path William's experiences in the theatrical and aristocratic world of the eighteenth century. It is long and not faultless in construction. But the episodes are told interestingly and artistically. The leading idea is to show how a man with no definite purpose or strong will of his own goes out into the world and is gradually moulded and taught by his experiences. It is what the Germans, who are very fond of this form, call an *Entwicklungs-*

roman, a novel of development or education or culture, as one may choose to regard it. For at least forty years it formed the model for a long list of imitations. The most interesting figures in the book are Mignon and the old harper, two remarkably original and entrancing characters. To many readers—Carlyle, for example—the discussions on all manner of subjects, literary, social, ethical, and political, contributed largely to the enjoyment of the book.

While *William Meister* no longer appeals to us as it did to an earlier age, *Hermann and Dorothea* possesses the secret of eternal youth. It is so thoroughly German, too, in its quaint mixture of the naïve and the dignified, the earnest, the humorous, and the pathetic. It points backwards to Bürger's *Luise* and forwards to a whole chain of works, Mörike's *Idyll of Lake Constance* and Keller's *Romeo and Julia*, which represent with the delicate, idealising hand of the classicist the humble joys and sorrows, trials and triumphs, or, it may be, tragedies of village and country life. Mörike has the greater fund of humour, Goethe the superior skill in visualising the scene and delineating the characters. The use of the hexameter gives a touch of the Homeric to the simple theme. Goethe has here proved his own statement, that there is poetry everywhere, if the poet can only bring it out.

From the beginning of the nineteenth century Goethe shows signs of growing old. He was now more than fifty years of age. It is seen not in a falling-off in poetical power, but rather in a certain aloofness and inability or unwillingness to respond to new suggestions. Thus, as *Pandora*, contributions to the *Propylaea*, and *Helena* show, he remained a classicist while others had been carried away by the Romantic movement. There are romantic elements in *Faust*, and the *Divan* shows an interest in Oriental poetry which was characteristic of Romanticism, but on the whole Goethe's own development is completed. His work now points backwards rather than forwards. That is the case with his *Poetry and Truth*, begun in 1811, which records

artistically but with a fairly strict adherence to facts, his life up to 1776. The *Theory of Colour*, in which he opposed Newton, shows that we must not take too high a view of Goethe's scientific achievements. They are frequently exaggerated. He has contributed suggestions, but his scientific dilettantism is of interest principally as the hobby of a great poet with a remarkable range of interests. The continuation of *William Meister* proved an error, for the circumstances of the nineteenth century were so entirely different and, it may be frankly said, no longer of such interest or inspiration to the aging poet. As it stands, it is nothing but a shapeless mass with little to recommend it but a few of the short stories that are woven into the varied patchwork. The *Elective Affinities* was intended as one of these stories, but it grew so much under Goethe's hand that he made it an independent novel. The theme, which shows how like draws to like, in opposition even to bonds of marriage or convention, is somewhat coldly and analytically discussed, the characters are remote and exceptional, and the whole somewhat prolonged. Ottilie's diary, which is the receptacle naturally of Goethe's thoughts rather than Ottilie's, interferes seriously with the artistic unity of the novel.

Some of the best work of Goethe's old age is contained in his epigrams in prose and poetry. His late ballads, on the other hand, are rather lifeless. His lyrical poetry has grown more reflective and objective. In the *West-Eastern Divan* the pulse of passion beats more languidly, but there is the compensating charm of wisdom, self-mastery, and humour in the subjective parts of this Persian garden of blossoms. The pages of *Art and Antiquity* show how Goethe continued to be interested in literature, art, and science. His *Diaries*, his correspondence, and especially the *Conversations with Goethe*, which Eckermann recorded, are invaluable for the student of Goethe's work and personality. His last artistic effort was devoted to the completion of *Faust*, which had, as it were, accompanied him

through life. It was born of the "Storm and Stress," it drew its early inspiration from folk-poetry and legend, it went with Goethe to Italy, it bears traces of Classicism, of the French Revolution, the Romantic movement, and of Goethe's admiration for Byron. It was principally the first two and the last two acts of the second part that remained to be done—the *Helena* forms the third—and now they were to be completed in the calm of the poet's old age. He accomplished the task not always in a form artistically beautiful, but with a profundity and wealth of imagination worthy of the beginnings. In the last act, which is one of the best, we see the old man—Faust is now a hundred years old—still striving and optimistic like the aged Goethe himself. He has foresworn everything but his idealism. This *dunkel Drang* has driven him through sin and bitter experience to clarity, and has enabled him by the grace of God finally to emerge triumphant over evil. No work can occupy a poet for sixty years and be the final expression of his philosophy of life without suffering in form. Some things, certainly, like the *Walpurgisnachtstraum*, might well have been omitted. But small flaws are easily overlooked in a work which is so great in conception and range, so full of human questions of the deepest interest, such as the meaning and power of evil and the spiritual freedom of men, not put as cold, academic questions, but moulded into poetry from the experience of a long and fruitful life. *Faust* is the eighteenth century as seen and lived by the greatest of eighteenth-century poets, and remains the one great work in German which, without hesitation, we may rank among the literary masterpieces of the world.

There was a time, about the middle of last century, when Johann Friedrich von Schiller was regarded as the compeer, if not the superior, of Goethe. Wolfgang Menzel had made the most of Goethe's weaknesses, and Schiller, as the poet of freedom, was warmly cherished by a revolutionary age. In no respect, however, can he bear com-

parison with Goethe. He lacked Goethe's advantages, but he lacked also his mental breadth. Till within ten years of his death, his life was a struggle, for a livelihood on the one hand and to attain culture on the other. The story of his education under and flight from the despotism of the Würtemberg Court is well known, but even harder days were in store for him until Körner of Dresden stretched out a helping hand. The early work is poor in form, especially the *Anthologie*, and even plays like *The Robbers* or *Intrigue and Love* are only redeemed by individual scenes or by a few characters like the music-teacher Miller and the secretary Wurm. *Don Carlos*, which was partly "Storm and Stress" work, partly under the influence of a ripening Classicism, is better, though the unity of the drama suffered by the change. The next few years, in which Schiller was devoting himself to historical and philosophical study, latterly as Professor of History in Jena, were equally unproductive of really great work. Poems like *The Artists*, or the *History of the Revolt of the United Netherlands*, or the essays on *Grace and Dignity*, *The Nature of Tragedy*, &c., can in no sense be considered great literature. They are important and interesting enough, especially as the milestones in Schiller's rapid development. But a different view must be taken of the extraordinary productivity of his last ten years. He attains greatness in philosophical poetry with pieces like *The Ideals*, *The Walk*, and *The Song of the Bell*. He is perhaps even greater, and certainly more popular as the author of ballads like *The Cranes of Ibykus*, *The Diver*, *The Glove*, and *The Fight with the Dragon*. Here he grasps the ethical thought below the bald narrative of his sources and brings it out with rare imaginative power. And, strangest of all, to one who knows the weakness of the youthful poet, he is now as victoriously master of the form as of the content. Here we see to some extent Goethe's influence, but to a larger degree it was due to the ripening of the poet's character and taste. The third sphere of Schiller's activity was the drama. *Wallenstein*,

Maria Stuart, *The Maid of Orleans*, and *William Tell* are so familiar that discussion of them is scarcely necessary. They show admirable skill in dramatic construction, they are grandiose, idealised pictures of great events and personalities, and lastly they are poetry. Passages like the separation of Max and Wallenstein, Joan of Arc's farewell to her native valley, Mortimer's description of the impressiveness of Catholicism, and Tell's monologue as he waits for Gessner in the *hohle Gasse* show us what Schiller could do when at the height of his powers. A great gulf lies between these plays and the realism of the modern stage, but they still live and are universally regarded as the best that German dramatic art has to show.

To turn from Goethe and Schiller to Hölderlin and Richter is to descend considerably. Hölderlin combined a passionate enthusiasm for Greek life and culture with an adoration of nature which belonged rather to the nineteenth century. His larger works hardly count nowadays. It is as a lyrical poet that he is remembered. This activity, too, was cut short by insanity in 1802, but in the few years since the beginning of his unhappy love he had produced a handful of poems pervaded by a noble and subdued pessimism, full of an ardent worship of the beauties of nature, and in a form which has something of the dignity of Classical art and the attractive sweetness of Romantic poetry. Jean Paul is also in many ways a transition figure. His formlessness is rooted in the "Storm and Stress," while his sentiment, degenerating often into sentimentality, is of the spirit of the early nineteenth century. He is a keen observer, he has gifts of humour and pathos, and is at his best in the description of quaint characters from humble life like Quintus Fixlein or Maria Wuz. From his numerous works, which are now practically dead, one might select scenes and sentences that deserve to live, but no individual book, except, perhaps, *Levana*, which is interesting educationally, is altogether satisfactory. Many of his ideas have been taken up by modern writers, but his

style is the worst ever written by a German of genius, and a much lower opinion must be formed of his merits than was once held, for example, by Carlyle.

The Classical age of German literature is unique in its individualism and cosmopolitanism. Lessing spoke once of love of fatherland as "heroic weakness," though he worked for a national theatre and a pure German language. Herder, regarding all men as citizens of God's city on earth, will allow no narrow national spirit. Goethe's indifference to national affairs is well known. Politics were, in his view, the affair of statesmen, to him art and science were the highest things. Man interested him not as a unit in a state, but as an individual in himself. Hence his dislike for the spirit of Rome and his enthusiasm for Greece. Schiller's views changed from time to time. In youth he was revolutionary, republican, and cosmopolitan; he speaks of patriotic interest as being only for unripe nations—for the youth of the world. After the French Revolution he discarded republicanism, and in *Tell* sang the praises of a people defending its liberties. The Classical Age was again marked by enlightenment, and by toleration in religion. This we see in Lessing, Goethe, and Schiller, while Herder and Richter had more definitely Christian sympathies. To Herder and Schiller humanity is the great aim, history is the study of humanity in its natural and inevitable advance. Schiller has been well called a *Weltverbesserer;* he believes firmly in the idea of progress. We find the same spirit in regard to education, especially in Lessing, Herder, and Richter. Goethe, Herder, and Richter all denounce mere philological teaching. Goethe, however, has great faith in classics as a model, so, too, Lessing, while Herder and Richter wanted a German art and a more practical education. To Goethe individual culture is the important thing, and culture he regarded as rooted in this life. "The purpose of life," he said, "is life itself." There can be no question that it was the decentralisation of Germany and the radical differences in the several courts

that on the one hand explain and on the other made the expression of such views possible. Goethe disliked Berlin, and the drama of Schiller would have been as impossible there as in Würtemberg. Whether in a modern Germany these writers would have thought and written differently is probably a futile question. But there can be no doubt that, apart, of course, from the spell which genius always exercises, it is just this breadth of vision, this individualism and steadfast idealism in art as in life that make German classical literature so interesting and valuable from an international point of view.

B. MODERN GERMAN LITERATURE

The most striking feature of modern German literature is its complexity. The nineteenth century was fruitful in ideas, discoveries, and intellectual movements, but they were frequently concurrent or so inextricably interlaced in their influence upon literature that a simplified scheme of the development is impossible. In his *History of German Literature in the Nineteenth Century*, the late Richard M. Meyer simply divided the period into decades, but such a solution is a mere confession of helplessness. The prevailing tendency in the first thirty years of the century is the Romantic. This movement took the form of a revolt against the criticism of Lessing and all other attempts to place restraints upon art and its expression, and enthusiastically asserted the ascendancy of imagination and feeling over reason and criticism. It is the most original of all German literary movements and the one which has influenced most strongly the literatures of neighbouring countries. In various forms it may be said to have lived on, in spite of reactions, in Mörike, Scheffel, Wagner, Storm, and others almost to the present day. Side by side with this there has been a steady increase of interest in simple indigenous art—what the Germans call *das Volkstümliche*. We see this in Görres' *Volksbücher*, in the collections of folk-songs by Arnim

and Brentano, Uhland and Liliencron, in the novel of village life, in the popularity of the peasant as the hero of novel and drama, in the *Heimatkunst* or purely local art of the present time. This movement inspired some of the best work of Mörike, Auerbach, Keller, Storm, Groth, and Fontane. Throughout the century, too, there is a current of patriotic and political poetry. In the rising against Napoleon, in 1840 and again in 1870, it is a poetry of war directed against France. In Börne, Heine, and their successors it assumes the form of a radical agitation against the strictness of the censorship and the want of representative government. In Herwegh, Heine, Storm, and many more it is a longing for national unity. When this was achieved, it appeared again in the dramas of Wildenbruch as a glorification of Prussia and the Hohenzollerns, while in more recent times, under the influence of men like Treitschke and Nietzsche, it has assumed the form of worship of force and militarism, imitated and expressed in many minor writers, but with notable reactions, as in Bertha von Suttner's famous novel *Disarm*. A much deeper and more fruitful literary movement was that which was derived after 1871 from social forces. The transformation of Germany into an industrial nation gave rise to the social problem, the Social Democratic party, and the naturalistic school of literature. Here writers direct their attention to the lower strata of society, and portray these exactly as they see them. The literary photograph usurps the place of the literary picture. Since 1895, however, there are signs of a neo-romantic revival, in which the supernatural and the imaginative, symbolism and allegory are once more asserting themselves. Besides these there are minor currents, the enthusiasm for freedom roused by the Greek War of Independence, a recurrence to Classicism in Grillparzer, Platen, and Wagner, a strong vein of pessimism which revealed itself in the *Weltschmerz* of Lenau and became, under Schopenhauer, the prevailing tone in the middle of the century. The fact that the nineteenth century has been a learned age has brought new literatures,

especially those of India and Persia, under review, and has led to determined efforts to clarify criticism and aesthetics. Much that has been written bears the stamp of zeal rather than of genius. This, too, has been an age of great historians—Niebuhr, Ranke, Treitschke, Mommsen; and literature has burrowed industriously but with no great success in this field. The wonders of science threatened at one time to remove the crown from poetry, but in later years the theories of biologists in particular have presented a rich fund for literary motives. The religious question which was opened up in a new sense by Strauss' *Life of Jesus* in 1836, the growth of the Higher Criticism, and the clash of philosophical systems (Kampf um die Weltanschauung), have bulked largely in modern intellectual life and find their reflection, one may say, in all writers of importance.

1. ROMANTICISM.—From 1798, when the *Athenæum*, the organ of the Romantic school, was founded by the brothers Schlegel and Tieck, to the Greek War of Independence, is the first epoch in modern German literature. As a period it was fruitful in suggestions and ideas which affected not only literature, but also, and perhaps to a greater degree, philology, historical research, criticism and education. In letters it resembles the "Storm and Stress," of which it was the direct descendant, in that it failed completely to produce masterpieces. In the novel and drama the demand for individual freedom destroyed all sense of technique; in the lyric the æsthetic aloofness from real life characteristic of a Novalis degenerated into vagueness and anæmia. The world of a Brentano, Eichendorff, or Uhland is largely mediæval and phantastic, and in consequence the literary harvest of these twenty-five years is meagre. In a rapid review we would note the translation of Shakespeare by A. W. von Schlegel, some of his brother Friedrich's criticism, Kleist's dramas, a handful of poems from Novalis and Eichendorff, contributions to the short story from Tieck and Hoffmann, Grimm's *Fairy Tales*, Chamisso's *Peter Schlemihl*, perhaps Fouque's *Undine*, certainly Eichen-

dorff's *Life of a Good-for-Nothing* and Uhland's ballads. The real genius in this group was Heinrich von Kleist, who showed equal power in tragedy and comedy. There is acute, humorous portrayal of the topsy-turvyness of village life in *The Broken Pitcher*. *Penthesilea*, on the other hand, the tragedy of the Amazonian Queen who destroys what she most loves, is high poetry, elevated and dignified. *Käthchen of Heilbronn* is over-sentimental, a drama of extremes, but it has charm, and that is the important thing. The *Prince of Homburg* is Kleist's masterpiece. It represents with great historical freedom, but very convincingly, the character of the Prince who won the battle of Fehrbellin in disobedience to the orders of the Elector of Brandenburg. It is an interesting picture of a mind woven of imagination, love, impetuosity, cowardice, and heroism. The same psychological minuteness is to be noted in Kleist's best story, *Michael Kohlhaas*. Unfortunately, Kleist's character was not made for happiness. His patriotic dramas could find no place on the stage during the domination of Napoleon. Goethe's failure to see his promise had also a discouraging effect, and Kleist put an end to his life in 1811, before his name was made. The ballads of Ludwig Uhland were mostly written between 1805 and 1830, the last half of his life being devoted largely to scholarship and politics. He was a Swabian, and stands apart from the contemporary romanticists, especially in his clear, effective style. The subjects of his ballads are drawn from legend and history, the figures are frequently mediæval, but he makes them live. He is a master of many styles, from the epic breadth of *The Minstrel's Curse* to the dramatic intenseness of *The Blind King*, or the lyrical sweetness of *Der Wirtin Töchterlein*. His dramas and lyrics fall far short of his ballad work, but here he is entitled to a place in the front rank.

2. The Age of Heine.—The second quarter of the century comes to a definite close with the revolution of 1848. It is much less uniform in character than the preceding age. In Heinrich Heine, the most conspicuous figure of the

period, we see a strong romantic vein, especially in his inimitable *Book of Songs*. But even here there are signs of revolt in that keen irony which turns its shafts upon the fairy forms and phantoms and dissolves them into nothingness. This attitude was due to disappointments in life and love, to his clear Jewish intellect, and the radical tendencies of his mind. His political and critical writings have exercised a strong influence upon the style of modern journalism, but they fade into insignificance before his merits as a poet and a writer of descriptive prose. He has that wit and *esprit* which are so rare in German literature, and as a master of prose style only Nietzsche among the moderns can be compared with him. In lyrical and ballad poetry his imagination, which in its glow and splendour is Jewish rather than German, enabled him to achieve the highest that can be attained by purely romantic means. But he broke through the romantic tradition and became the poet of life as he saw and felt it. He is, as George Eliot said, not a mere echo, but a real voice. That voice is sometimes grating and repulsive, but sometimes it is inexpressibly sweet, and, in spite of all his anti-Semitic disparagers, *The Two Grenadiers*, the *North Sea Pictures*, portions of the *Travel Pictures*, and some of the poems composed in his last years on his "mattress-grave," are among the great things in the German language.

Apart from Heine, the "young Germans," Börne, Laube, and Gutzkow, and the political poetry of the 'forties do not merit much attention. Literature and public life were in conflict. Fritz Reuter spent seven years in prison for wearing the political colours of a club. Heine and Börne went into exile, and after the revolution Herwegh, Wagner, and Freiligrath had to follow their example. The mass of poetry which sprang from the agitation is rhetorical and only of temporary interest. Freiligrath has something of a reputation among us, due partly to his long stay in London, but his really good poems are few in number. Some of the patriotic songs have lived, like Becker's *Wacht*

am Rhein, and it is interesting that the other national song, *Deutschland über Alles*, first appeared in a collection of poetry which cost the author, Hoffmann von Fallersleben, his professorship in Breslau.

The Swabian and Austrian literature of this period, which has little reference to politics or nationality, is much more artistic. Eduard Mörike is scarcely yet known beyond Germany, but he is one of the three or four best German lyricists. He carried on the Romantic traditions, but he is, to a greater degree, the poet of his own Swabian people and home. The secret of his art is simplicity and truth. As a country minister he had the leisure and opportunity to observe the interesting traits of his parishioners and the life of nature around him. He was hypochondriac, a day-dreamer, intensely disinclined to work—he would have a substitute preaching while he would be lying on his back in the manse garden. His prose is inferior to his poetry, because it is more formless, and he lacked constructive talent. His ballads are scarcely vivid enough, but in the naïveté and quaint humour of his idylls he has no rival in German, and his lyrics, *The Forsaken Maid*, *Agnes*, *Peregrina*, *The Gardener*, *The Soldier's Bride*, are models of sweetness and harmony.

Swabia produced other interesting writers, Kerner, Schwab, and Vischer, and it was here that Nicolaus Lenau, the Austrian poet, was first recognised. He had many of the poet's gifts, melody of verse, imagination, and sublimity of soul. He brought into literature a new landscape, the *pustas* of Austria, and he peopled them with figures which pulsate with dramatic life. His visit to America, disappointing though it proved, brought in a new harvest of poems. Over all, however, from first to last, lies the melancholy, the resigned hopelessness of the man who, unfortunate as he was unpractical, could find no place for himself in the scheme of things. The atmosphere of Austria seems to have engendered this kind of pessimism. Under the régime of Metternich music alone enjoyed freedom.

Here Beethoven and Schubert composed some of their best work. But the literary man feels himself in fetters, unable to develop his ideals. Lenau's life ended in insanity, Raimund shot himself, and Franz Grillparzer, Austria's greatest dramatist, shut himself off from publicity at the very height of his powers. In his three great plays, *Sappho*, the trilogy *The Golden Fleece*, and *Hero*, Grillparzer has sought to blend Classical form and legend with modern sentiments and problems. The first is the tragedy of the poetess who seeks earthly love and happiness in addition to the heavenly gift of song. The second is the finest rendering of the story of Jason and Medea in ancient or modern literature. In the third it is the study of Hero rather than of Leander, the problem of the priestess who takes her vows before she knows what it means, and is overwhelmed by love when it comes, that holds our interest. The background of the lonely temple, with the ever-present fatal sea, is woven into the play with a skilful hand. Very different from these are the other plays of Grillparzer, *King Ottokar's Greatness and Fall*, a historical drama, and the comedy, *Woe to him who Lies*. It was the rejection of the latter play that caused Grillparzer to cease writing for the public. Of the plays published after his death only the *Jewess of Toledo* can be called a success. Grillparzer's high aims were not understood in Vienna, and he was easily discouraged. It was certainly galling that the Viennese preferred the sentimental plays of Friedrich Halm, the witty but superficial farces of Nestroy, or the comedies of Raimund, who sometimes, indeed, by his excellent technique and skill in portrayal of character, proved himself a not unworthy rival. From a literary point of view, these men stand to Grillparzer as Grün and Zedlitz stand to Lenau; they are part of the Austrian development, but do not rise very far above mediocrity.

The novel in this period is poor. The works of Gutzkow and Laube are forgotten. Immermann lives only by the story *Oberhof*, one of the earliest village tales. Willebald

Alexis, the Brandenburg historian, is lifeless and long-winded, and there only remains Wilhelm Hauff, who certainly had the gift of story-telling, though the merit of his chief work, *Lichtenstein*, in itself a most readable book, is lessened by the fact of its being so close an imitation of the manner of Scott.

Romanticism lingered on in one or other of its phases in the writers of this age. Wilhelm Müller excelled as a song-writer who learned his art from the *Volkslied*. Friedrich Rückert represents the Oriental interests of the Romantic school, but he wrote too much, and his *Wisdom of the Brahmas* is heavy and didactic. Platen, too, was interested in Persian forms, but otherwise he is anti-romantic in his literary comedies like *The Fatal Fork*, a skit on the fate-tragedies, and in the Classicism, both in spirit and execution, of his lyrical poetry. He was a somewhat lonely figure, and even yet his poetry has found few admirers. It appears cold and statuesque. The recent publication of his *Diaries* has made it clear that Platen was an interesting personality, a scholar, a thinker, a kindly friend, but he failed to express himself, and bears to-day the reputation of a form-perfect but frigid poet of the aristocratic type. Another solitary figure in this age is the Westphalian poetess, Annette von Droste-Hülshoff. She tried various literary forms to give expression to the life and beauty of her homeland, in which her whole soul and art are rooted, but she succeeded principally in the short story and the lyric. *The Beech-tree of the Jew*, a fine study of the way in which a country lad is driven to murder, and years after to atonement, is, with the *Oberhof*, one of the earliest and best *Dorfnovellen*. Her lyrics are strong rather than graceful, for she objected to filing and smoothing. "Let them be as they are," she said. But the poetic, sometimes passionate, sometimes old-maidish soul is there, and a kinship with nature which is almost bodily attachment. She was extremely short-sighted, and dwells consequently on the sounds of nature and the minute things which most

poetry overlooks. *The Night Spent in Waking, Moonrise,* and *In the Moss* are characteristic of her art, which combines delicacy of feeling with lines which in their sturdy strength remind us of granite rather than of marble.

3. THE AGE OF KELLER.—The third quarter of the century, roughly from 1848 to 1870, but extending in some cases beyond these limits, was the richest in artistic achievement of any modern period. It was a time of stress and trial, it saw the great wars against Denmark, Austria, and France, and it is noteworthy that it was so much more fruitful than the last period, which was marked by peace and great industrial prosperity. The radical agitation became silent, the motto of the Munich School was "Art for art's sake," and that meant detachment from contemporary life, interest in history, and description of countries and manners other than those of Germany. Geibel, Heyse, and Scheffel were the chief figures in the Munich circle, but they had many satellites like Greif, Schack, Bodenstedt, Lingg, and Leuthold. Nowadays the poetry of these authors is not rated high. A few songs in pleasing form but of no depth are its chief legacy. Only Scheffel and Heyse have distinguished themselves permanently. Heyse is the most prolific writer of stories in German. His originality is astonishing, and he has the sense of style. In his larger novels, *Children of the World, In Paradise,* &c., he is less successful, for here his superficial knowledge of life, especially middle and lower class life, becomes more evident. Scheffel is the author of the *Trumpeter of Säckingen,* a vigorous but by no means great epic, and of a really well-told story, *Ekkehard,* a picture of Swabian life in the early Middle Ages. The main theme is modern, for it is the story of the monk's love for his high-born mistress, and touches on the question of celibacy among the Catholic clergy. Frau Hadwig, too, is rather much of the modern coquette, but, despite its faults, *Ekkehard* is extremely interesting, and remains, so far, the best historical novel in German.

The Munich School was in its time the hope and pride of German letters, but that reputation has gone for ever, because far better work was done by the men who stood outside it altogether, but who had to wait a good few years for their merits to be recognised. The novel, in particular, showed great vitality. Little attention need be paid to the stories of American life by Sealsfield and Gerstäcker or the military sketches of Hackländer. The best work grew out of the *Dorfnovelle*. Berthold Auerbach's *Tales of the Black Forest* are frequently unreal and sentimental, but where they are not, as in *Diethelm of Buchenberg*, they are altogether enjoyable. In Jeremias Gotthelf there is excellent humour, for example, in *The Notary in the Trap*, but occasionally also a fairly strong vein of moralising. What these men began on a small scale, Reuter, Ludwig, and Keller carried on with greater genius. Fritz Reuter's stories and verse-anecdotes are in Platt-deutsch, a sign of the growing realism of the age, and this is an essential feature of the work. Translated into High German, they lose half of their humour and flavour. The same applies to the lyrics and ballads of Klaus Groth. Otto Ludwig's stories have also a marked local colouring, and sometimes he uses dialect. In his chief novel, *Between Heaven and Earth*, he has surpassed himself in weaving from the simple motives of Thuringian village life a story of universal human interest. The scene is the home of a slater and his family, and the theme, as it unfolds, reveals the tragedy of suspicious old age in its tyranny over efficient youth, and the equally tragic conflict between the conscientious Apollonius and his unscrupulous brother, who steals his betrothed, and subsequently, driven by conscience and vice, almost wrecks the lives of all concerned. The story is very finely worked out, and is one of the best novels of family life in German. Ludwig tried his hand at the drama also, but with less success. His plots are rather loosely constructed, and, when reading them, we feel that they would have been better in the form of novels.

Gottfried Keller is by universal consent the greatest of these writers of stories. Apart from Heine, who is so different that comparison is impossible, he is the most conspicuous figure in the whole nineteenth century. He has not the lightness and grace of a Heyse, but in the keenness of his observation, the richness of his humour, and his rugged, profound, but wonderfully plastic powers of presentation, he is excelled by Goethe alone. Some of his work, like the long autobiographical novel *Green Henry*, demands a certain maturity in its readers. It might well be called the "William Meister" of the nineteenth century. His lyrical and ballad work is somewhat uneven, sometimes rather vague and lacking in melody, but in the short story he has no peer. The *People of Seldwyla* appeared in 1856, and gave already a token of his merits, but these were unrecognised, except by a few, till a second part came out in 1874. The stories are of all kinds, humorous, pathetic, tragic, and the same mastery is revealed in each sphere. *Romeo and Juliet in Village Life* is an example. The quarrel of the parents about a trifling field boundary is told with such quaint humour that the reader feels he is in for another frolic. But as the quarrel develops, bringing ruin and unhappiness in its train, till Sali and Vrenchen determine to have one last day of enjoyment before the river closes over their embraced forms, the master has us under his spell, and we follow breathless to the close. It is all told so simply, with no forced pathos or sentimentality, that the art conceals itself. In *Seven Legends* Keller leaves the sphere of Swiss life and retells with irresistible humour, which, like all true humour, has a great deal of wisdom in it, some mediæval stories. *The Hypocritical Vitalis*, the story of a zealous monk who was regarded as a vicious dissembler, is the best in the volume. Other two collections of "Novellen" appeared, the *Zürich Stories* and the *Sinngedicht*, a series woven round the theme of a bachelor's search for a wife. With these stories Keller brought into German literature the rugged independence and strength

of the Swiss character. His humour is finer and savours less of the beer-jug than is frequently the case in German—in Scheffel, for example. A master of prose he is not, but the style is adequate. It expresses accurately the naïveté of his genius, the clearness of his visualisation, and the calm dignity and repose of his character.

The Schleswig writer Theodor Storm is not so virile as Keller. Early work like *Immensee* is dainty and sweetly sentimental. As he grew older, his characters took more definite shape. Stories like *Aquis Submersus* and *John Riew* display a much healthier realism. His peculiarly elegiac, reminiscent temperament found more suitable expression in the lyric. His poems are not numerous, but they are choice. In them we find in uniformly-pleasing lines the poetical revelation of one of the most lovable characters in German literature.

Gustav Freytag is a typical German literary figure. He left the lecture-room for journalism, editing for a time the *Grenzboten*. He was interested in the drama, and wrote a critical thesis on its technique. He published a very successful comedy, *The Journalists*, which, though a skit on politics and journalism half a century ago, is still of interest. It is as a novelist, however, that Freytag is best known. In *Soll und Haben* he was the first to give a really convincing representation of commercial life, with sidelights thrown on other classes. *The Lost Manuscript*, which portrays university and aristocratic circles, was neither so well planned nor so true to life. In history, too, Freytag was widely read. He published a series of popular volumes, entitled, *Pictures of the German Past*, and his large historical novel, *The Ancestors*, was so much admired that it called forth a host of imitators. Men like Dahn and Ebers were, however, much more pedantic and less original than Freytag. They were at one time the rage, but are very nearly forgotten to-day. The first sections of *The Ancestors*, which portray life in the fourth and eighth centuries, are much better than the later ones. The later

ages were not so suitable for heroic treatment, and the author's own interest in the work had flagged.

Friedrich Spielhagen was the first of the modern novelists, but only in spirit, not in style. *Problematic Natures, Hammer and Anvil,* and *In Rank and File* owed much of their interest to the mild socialism of their author. He has his theories and works them out with a considerable gift of story-telling, but modern criticism has shattered the most of his former great reputation by showing up the unreality of his portrayal and the absurdity of his leading characters. Wilhelm Raabe, though never so popular, had much more literary genius than Spielhagen. His short stories are better than the novels. In the latter he resembles Jean Paul in his stylelessness, his humour, and the way in which he interrupts the narrative with personal opinions and explanations. To the patient, however, *The Chronicle of Sparrow Lane* or *Abu Telfan* provides entertaining reading.

Some of the authors mentioned above wrote on into the last quarter of the century. Paul Heyse died quite recently. And there are other authors who might be dealt with in a fuller history—Wilbrandt and Jensen, for example, who, though they wrote much later, belong in spirit to this age. Conrad Ferdinand Meyer was similarly only five years younger than his Swiss compatriot Keller, but previous to 1870 he had published only a small volume of poetry. He possessed independent means, and had, like Keller, hesitated between poetry and painting. He was doubtful, too, at first whether to write in French or German. In Meyer we see the diffidence and conscientiousness of the studious recluse. His works fill only eight small volumes, but there is nothing that had not been pruned and revised till it satisfied his fastidious taste. It is difficult to say whether he is greater in verse-epic or prose-epic. His ballads *The Feet in the Fire, The Gliding Purple, King Attila's Sword,* break away from the traditional ballad style which had come down from Percy's *Reliques* through Bürger, Uhland,

and Strachwitz. He is equally dramatic, equally plastic, but more concise, more Classical in style. His historical novel, *Jürg Jenatsch*, is not on the same level as his shorter stories, *Gustav Adolf's Page*, *The Amulet*, or *The Saint*. He likes to choose his material from that age of great events and characters, the Italian Renaissance. He has little interest in contemporary life, but in recreating the past in story or ballad or epic, as in the charming poem *Hutten's Last Days*, he has very few equals.

We have already mentioned two of the dramatists of this period, Freytag and Ludwig; the other two, Hebbel and Wagner, are of more importance. Friedrich Hebbel is the weightiest German writer on drama in the nineteenth century, and it is wonderful how this self-taught man worked his way up to an artistic conception of life. His plays are highly praised by many authorities, but they have not been very successful on the stage, and they will hardly find a home among us. The biblical *Judith* is unfortunately a repulsive theme, and *Maria Magdalene* is convincing only when we grant the probability of the heroine's moral lapse, but in any case we wish it were untrue. *Herodes and Marianne*, again, though excellently constructed, is unsympathetic, for Herodes is a fool as well as a tyrant. *Agnes Bernauer* is the tragedy of simple innocence in conflict with the interests of the state, and though again the course of events is inevitable and well delineated, the close is repellent to a modern audience, whether democratic or not. *Gyges and his Ring* is a fine dramatic rendering of the fable from Herodotus, and *The Nibelungs*, Hebbel's greatest work, is a brave effort to dramatise the Middle High German epic. Wagner attempted the same theme, but while Hebbel followed the epic fairly closely, except in so far as he sought, with doubtful success, to make much more of the contrast of Christian ideals, Wagner went back to the old legends and filled them with his own artistic conceptions. Wagner's influence on art generally can hardly be overestimated. In literature it is not great. His dramatic theories have been

followed by few and the text of his operas is not such as would commend itself to the imitation of any literary artist.

4. LIVING AUTHORS.—The last period of modern German literature is to us, who are living and taking part in the problems which it presents, naturally of great interest. These problems are as manifold as they are important. They spring from many sources, the social struggles which new industrial conditions have created, the religious question which the Higher Criticism stimulated on the one side, and which the antagonism of social democracy and of the unsocialistic opponent of everything established, Friedrich Nietzsche, affected on the other. There is, too, the gathering conflict between democratic ideals and the autocratic monarchy with all the bureaucratic and military authority of which it is the head and symbol. There is the clash of collectivism and egoistic individualism, there is the slumbering but dangerous antagonism of Papal infallibility and the absolutism of the Empire. There has been a powerful awakening of national patriotism coupled with a new exclusiveness towards what is foreign and a desire for political, industrial, and cultural expansion. In its unrest this period reminds us of the "Storm and Stress." We have seen a new literary ideal set up, that of the naturalistic school, which is so extreme and prosaic that we can now, when it is dying down, hardly understand its former popularity. It would substitute the literary sketch for the rounded work of art, it banished poetry from the drama, it kept its eye riveted on the unsavoury phenomena of life, and made the Muse forsake the heights and tread continuously in the gutter. In its reaction against the unreality of a Lindau or a Spielhagen it had some justification, and it has bequeathed a residuum of healthy realism to an age with saner and broader ideals. In all this period we note the German tendency to emphasize the importance of content at the expense of form. And it is very doubtful indeed whether very much of the enormous production of the present age will survive very long after it. Naturally it is the novel that is most fre-

quently chosen by young writers as the means of expressing their social, political, moral, and other ideals. Yet there is no great living novelist in Germany. Among the interesting individual achievements we note the novels of Berlin life by Fontane, who in early life had made a name for himself as ballad-writer and historical novelist. There is the *Dame Care* of Sudermann, a charming study of country life, far above the author's later work. Frenssen has published several interesting books, *Jörn Uhl*, which owes not a little to Sudermann, *Peter Moor*, which describes a soldier's experiences in the Herero campaign, and the somewhat notorious *Holy Land*. Clara Viebig has done some striking work in the social novel; *Those before the Gates* shows the evil effect of suddenly-acquired wealth upon the simple country people who lived on the outskirts of Berlin during its industrial expansion, while *The Sleeping Army* is a capital study of the Polish question in its political and social aspects. We should mention, too, as characteristic of the age, the inartistic but widely-read novel of Bertha von Suttner, entitled *Disarm*, and its counterparts in the military novels of Beyerlein, Ompteda and Bloem. The Austrian story-writers, Ludwig Augengruber, Marie von Ebner-Eschenbach, and Peter Rosegger, have added many delightful tales to the already almost too numerous array. In lyric poetry there is the same productivity, but only a few names, Detlev von Liliencron, Friedrich Nietzsche, and Richard Dehmel, stand out prominently. When we turn to the drama, we find at last in Gerhart Hauptmann an artist of originality, who goes his own way uninfluenced by the fashion of the moment. Of his early naturalistic work, *The Weavers* deserves most attention. It represents the revolt of the Silesian weavers in the hungry forties. Another striking play of Hauptmann's is *The Sunken Bell*, which takes us into the realm of fairyland and portrays somewhat vaguely but poetically the longings of the artistic mind. In comedies of lower life Hauptmann also excels, while his historical pieces and the novels which he has been writing

lately are not so noteworthy. Hermann Sudermann, a Silesian like Hauptmann, began very promisingly in the drama with his problem plays *Honour* and *Magda*, but his more recent work has degenerated into sensationalism and mediocrity, which is redeemed only by the author's skill in technique. Apart from these dramatists there is no one of great importance. One or two of the less melodramatic historical plays of Wildenbruch may live. One might note, too, Fulda's comedy, *The Talisman*, and Halbe's *Youth*, an interesting drama on the problem of adolescence, and something should be said of the works of the Austrian Hofmannsthal, *The Death of Titian* and *The Fool and Death*, which, if not drama, are at least fine poetry.

In all this period the most original and striking figure is Friedrich Nietzsche. His lyrics have already been mentioned, and, in addition to them, some of his prose works, especially *Zarathustra*, will live as literature. With the content of Nietzsche's works we have little to do. His English school of admirers take him very seriously as a philosopher, but there are very few thoughts in Nietzsche which are not simply negations of other people's thoughts, and in his whirlwind assaults upon literary shibboleths in particular it is questionable whether it is not rather the joy of combat than any very deep conviction that impels him. He is the despair of theologian and philosopher, for their defence is heavy artillery and Nietzsche is the elusive Parthian. But he wrote prose as no one in his time could do, and he broke into poetry spontaneously like one inspired. His iconoclasm, combined as it was with a far-reaching and optimistic idealism, made him the idol and model of many young authors.

When we look back at the literature of the nineteenth century, we find no great writer of the mould of Goethe. On the other hand, there is a much larger number of men entitled to a place in the second rank. There are some spheres in which modern German literature is conspicuously weak—the epic in verse, comedy and humorous works.

The poverty of comedy is especially noteworthy, and Germans are well aware of their inferiority in this respect to the literature of France. We search the century in vain for a novelist who would rank with Scott or Dickens, but of good individual novels there are not a few. Many writers fail in this sphere through inability to construct, through pedantry, or a falling off of the interest of the plot. In the drama, again, there is perhaps no man of the very highest genius, like Schiller in the eighteenth century, but four writers like Kleist, Grillparzer, Hebbel, and Hauptmann are a very fair harvest for one century. The best work, on the whole, has been done in the short story or *Novelle* and in the lyric. For the *Novelle*, which may be anything from twenty to a hundred or more pages in length, the Germans possess a quite unique talent. In lyric poetry, too, closely allied as it is to music, the genius of Germany has from the first found a very suitable vehicle of expression. In critical writings the nineteenth century is rather poor. No one has been able to take up the mantle of Lessing. In several cases the best biographies of distinguished Germans have been written by foreigners. The learned German has two faults in particular—he fails to make the subject live, and he lacks the art to omit. The noteworthy difference between modern and classical German literature is this, that while literature in the eighteenth century is largely centred in Weimar, in the nineteenth, which has been an age of home or local art, nearly every single province of Germany is well represented. Above all, it was not till this century that North Germany had done anything almost in the literary field. But not only Germany—all German-speaking peoples have contributed richly. Lenau and Grillparzer in Austria, Keller and Meyer in Switzerland, are among the most original writers of the age. By the freshness of their outlook, subjects, and style they have done a very great deal to invigorate the literature of the Fatherland.

V

GERMAN ART

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THE arts of form in Germany pass through numerous phases between the fourth century and the twentieth, and at some periods and in certain aspects German art occupies a position of predominance, while at other epochs it is content with modest achievements on exotic rather than distinctly national lines. It may be noted at the outset that the qualities revealed in these phases of art are just the distinctive qualities of the German character that come out into prominence in other fields of activity. In some late mediæval paintings in the Rhineland the intimacy and tenderness of German feeling is revealed without any lapse into that sentimentality upon which in real life it sometimes verges, while the contrary quality of a hard, almost brutal, aggressiveness is distinctly in evidence in German painting of a somewhat later time. The early mediæval architecture of Saxony and the Rhineland furnishes a splendid illustration of the national love of order and capacity for organisation. The subordination of the parts to the whole, and the intimate relation of part to part, make the German Romanesque minster the finest existing exponent of this phase of architecture, and there is no nobler monument of the national genius. The quality which more than any other has given Germany her proud position in the domain of the higher culture is intellectual depth, and this quality, that in more modern days lifted German philosophy and German music to their position of supremacy, found its outcome in the palmy days of German

painting in the profound and moving design of Albrecht Dürer. Dürer's work, however, like that of the German school of painting in general, is affected to its detriment by a tendency that has been noticed in other spheres of German activity—that is, over-insistence on detail, leading to a neglect of larger issues. This is the result of a conscientiousness which gives the task of the moment absorbing interest, but, by chaining the mind to the trivial and accidental, may check its free range over the wider field.

The history of German art begins with the appearance of the Teutonic peoples in force within the bounds of the Roman Empire, for the Germans who overran the provinces exhibited gifts in design that are genuinely national. The decorative art of this period, exhibited mainly in the ornamentation of arms and of personal trinkets, such as brooches, buckles, and the like, is based on Roman art, but shows a distinctively northern feeling in the use of fantastic animal forms, which a high authority in Sweden has prophesied "will always remain for all time a most characteristic expression of the German imagination." The term "German" would at this period be used in a wide geographical sense. It would include the work of the Goths and Vandals in Eastern and Southern Europe and North Africa, that of the Lombards in Italy, the Burgundians and Franks in Gaul, and the Anglo-Saxons in England, as well as that of the Alamanni on the Rhine.

In the time of Charles the Great the limits covered by the term are circumscribed, but if we regard Charles, an Austrasian Frank, as a German, we must extend these limits over the whole of his vast dominions. The divisions of the Empire after his death resulted in the emergence of a region corresponding more nearly to the Germany of after history, and for the purpose of this sketch we may regard as German the Rhineland and the Neckar region, with Saxony and Westphalia, as far north and west as the North Sea coast and as far east as the Elbe and Moldau, beyond which the Slav element in the population becomes pre-

dominant. The metropolis of the whole region, so far as culture is concerned, is Cologne, but during the tenth century, the time of the Saxon emperors, the seats of the chief creative activities in the arts were farther to the east, in the towns and the monasteries of the region centring in the Harz.

The favourite residences of Charles the Great were in the Rhineland, and here there existed in abundance the Roman monuments which inspired his successful efforts towards a classical renaissance. The art which resulted represented a mixed style in which antique elements, as well as elements drawn from Celtic culture introduced by immigrant Irish monks, mingled with the Germanic, and there was nothing here that can be regarded as characteristically national. A little later, however, when Saxony took the lead, the word "German" begins to mean something far more distinctive, and from about 850 onwards to the beginning of the Gothic period in the middle of the twelfth century, Germany occupied what her writers would call a *führende Stellung*, and was the European centre for the practice of architecture and all the decorative arts including the illumination of manuscripts. After about 1250 the centre was removed to France, where Gothic art arose and produced its most splendid achievements, while from about 1300 onwards the place of prominence was assumed by Italy, and she resigned it in the first half of the seventeenth century to the Low Countries, after which, for the whole of the eighteenth, France was again in a position of unquestioned predominance. In the early mediæval or Romanesque period, accordingly, the best art in Europe was to be found in Germany, while from 1250 to the end of the eighteenth century she held a position second to France, Italy, or the Netherlands. It must be stated, however, that in the fourteenth century, and again in the period shortly before and after 1500, though in the mass and the average quality of her artistic productions Italy was supreme, yet German artists of the early Cologne school, and later

on, Dürer and Holbein, with others of individual genius, such as Matthias Grünewald, achieved independent masterpieces that take rank beside the best that Italy can show. Finally, from 1800 onwards, Germany, without in any branch markedly taking the lead, has played a worthy part in the various movements that have given life and variety to the artistic activities of the world of to-day. It must never, of course, be forgotten that from the middle of the eighteenth century onwards the artistic genius of Germany has expressed itself in the world's masterpieces of the art of music.

The Romanesque art of Germany represents a productivity inspired by the purest aims and served with the most painstaking devotion. It was practised largely in monastic surroundings, and on this fact depend many of its characteristics. The monkish craftsman was actuated by purely religious motives, and as he had to prepare his own materials and appliances, and was precise and careful in the use of them, his work was as good in execution as in idea. A German artist-monk of about 1100 A.D., who calls himself "Theophilus," has left us a technical treatise on artistic practice as it was understood in the cloister, and nothing ever written about art is more congenial to the spirit of the true artist in every age. The essential matter, in the eyes of Theophilus, was evidently the creation of beauty, without the intrusion of any direct theological or didactic purpose. He justifies the practice of art as a part of the religious life on the plea that man is thereby making effective his pristine likeness to the Great Artist of the world, who had made everything beautiful in its season. The church was to be so adorned on wall and ceiling and in furniture and fittings that it would shine like the Garden of Paradise, and become a sort of microcosm of the vast work of the Creator of the universe. The outcome of this artistic activity of the cloister is to be seen in the churches and museums of German towns such as Hildesheim, the home in the eleventh century of the great monkish craftsman, Bishop Bernward. The style of this decorative work is, of

course, weak in the human figure, but it uses ornamental motives with unerring tact. Animals, sometimes derived from those figured on Oriental textiles imported into the West, are freely employed, and the stock foliage motive is the classical acanthus that was brought into vogue at the Carolingian renaissance. Magnificent illuminated manuscripts were prepared for the Carolingian and Saxon emperors and other notable personages, and these were bound in sumptuous covers on which is perpetuated the technique of incrusting gold with coloured stones that was popular in the earlier migration period. Chalices and pattens, censers, candlesticks, reliquaries, and innumerable other objects for the service of the sanctuary, exhibit the monkish craftsman's skill in the manipulation of cast and hammered metal, the setting of semi-precious stones, enamelling, niello-work, and the carving in relief of plaques of ivory.

The style of this early mediæval decorative design was so good largely for the reason that the predominant art of the time was architecture, and the decorative crafts have always been at their best when in the service of the mistress art. The earliest monuments of Germanic architecture are the tomb of Theodoric the Ostrogoth at Ravenna and the minster of Charles the Great at Aachen, and these are both formed on early Christian models supplied by Italy. The development in Germany of a national architecture may be held to start, not with an actual monument, but with one figured on the plan of St. Gall, a well-known document of about 810 A.D. We have here the project for a monastic church of the first rank as it was conceived of at the time, and we see that the Early Christian basilican scheme was growing into the cruciform plan common in the later Middle Ages by the addition not only of a transept, but of a prolongation of the nave past the crossing, making the fourth arm of the cross. The plan gives evidence also that subsidiary altars were becoming multiplied in the larger churches, owing to the growth of an exaggerated reverence paid to relics. To accommodate a second important altar compar-

able in honour to the original " high " altar of the church, a second apse has been added at the western end, corresponding to the original one at the east, and this double apse becomes a speciality of German Romanesque churches. It is in its way a defect in them, for it renders impossible that effective treatment of the entrance end of the church with its spreading portals between the twin towers of the façade, which is the glory of the greater churches of France. A better result of the demand for the accommodation of multiplied altars was the addition of galleries over the side aisles affording space for these, a feature that becomes normal in German churches from the tenth century onwards.

The plans, and also, by the addition of galleries and towers, the elevations internal and external of the churches, had become by the tenth century somewhat complicated, and now in the eleventh we find the Romanesque style consolidating itself through a logical and consistent treatment of these varied elements.

It is because this logic and consistency are more pronounced in German Romanesque than in other examples of the round-arched style, that Romanesque architecture is recognised as belonging to Germany in the same sense in which Gothic belongs to France and the architecture of the Renaissance to Tuscany. The earliest existing monuments that present the style date from the close of the tenth or the beginning of the eleventh century. There may be mentioned Gernrode in the Harz, 960; St. Pantaleon, Cologne, 964–980; the Dom at Worms, 996; St. Michael, Hildesheim, 1001; the Dom at Mainz, 1009; that at Speyer, 1030 (the dates given are those of the respective foundations), but in every case save that first mentioned the buildings owe their present character largely to the alterations or rebuildings of the twelfth century, from which period date the vaults. The outstanding features of the best monuments of the style may be briefly described as follows. The plan is cruciform, the nave and transept being made of equal widths, and the feeling for regularity and order inculcated

in the predominant institution of the times, the monastery, expresses itself in the accurate spacing out of the interior by the multiplication or subdivision of the square where nave and transept intersect. This square repeated towards the east forms the fourth arm of the cross, *i.e.* the chancel or choir preceding the apse, to north and south the transepts; while the length of the nave is measured out by repeating the square westwards three or four times. The side aisles are made half the width of the nave, and are divided up into squares, each a fourth part of the size of the large square. In this way there is secured a proportionate division of the internal area which imparts a purposeful look to the whole, while this same division into squares reveals itself as of essential value at a subsequent date, when stone vaults, always in square bays and on the plan of the Roman intersecting vaults, come to be added. Another feature in these churches is also prophetic of vaulting, though introduced without any conscious reference to it. This is the alternation of supports (*Stützenwechsel*) according to which solid piers come at the corners of the large squares while the intermediate supports along the arcade are of slighter make. The solid piers later on take the function of sustaining the main vaults of the nave, the intermediate piers serving for the vaults on the smaller squares of the aisles. In the interior elevations the openings of the gallery over the side aisles are made to compose effectively with the arcade below and the windows of the uppermost storey, while the columns that subdivide these openings, relieved against the shadowed spaces within the gallery, lighten the effect of massiveness which dominates the interior.

A peculiarity of the plan is the correspondence of the two ends not only by the reduplication of the apse, but by the repetition of the transept, or transept and choir, at the western extremity. As the crossing is in each case covered with a pavilion or low tower, that is conspicuous in the external view, this arrangement gives the mass of the build-

ing, when seen from outside, a very symmetrical appearance, in which it contrasts markedly with the mediæval churches of France, England, or Italy. The grouping of the towers carries out this impression, as these are often placed in pairs flanking the eastern and western apses. It is at times not possible to tell by mere external inspection which is the altar and which the entrance end of the building, and this, which from one point of view may be regarded as a defect, as it conceals the purpose of the structure, has, on the other side, the advantage that it increases the air of completeness and regularity so characteristic of the style.

No examples are better fitted to illustrate the special qualities of German Romanesque than two Rhineland churches, the Apostles Church at Cologne, and the Abbey Church at Laach, in the Eifel, a few miles inland from Andernach. The former, which reached its present form at the end of the twelfth century, is singularly dignified and impressive, especially in its interior aspect, and few can enter it without recognizing the power of fine style in architecture to satisfy the æsthetic judgment, as a Greek temple satisfies it, with the sense of a great thought largely and harmoniously expressed. The latter church enjoys the rare distinction that it is a completely vaulted edifice begun and carried out on a consistent scheme in the space of about half a century, from 1093 to 1156, and for completeness there is no example of the style to compare with it. The scheme in the interior, though full of interest, is somewhat abnormal in the style, but the exterior gives us all the characteristics of German Romanesque at their best. The church is approached at the western end by an enclosed court or atrium of Early Christian form, into which projects the western apse. A western choir surmounted by a square tower, flanked to right and left by round towers with polygonal caps, produces an imposing composition for the entrance façade, while at the altar end the square western tower is repeated in a polygonal pavilion over the crossing, and the eastern choir is flanked by two square towers re-

peating the effect of those at the west. The general impression is one of a noble simplicity in mass and composition, while the detail is applied with a certain austere reticence that does not exclude richness.

The architectural decoration of these fine Romanesque churches consists partly in carvings, in which occur the decorative motives already noticed, and partly in tectonic features, some of which are apparently of Italian origin. This last applies to the dwarf galleries in which a series of round arches are supported on slight columns, and which are used to enliven the upper stages of external walls, especially in important situations such as the circuit of the apse. Italy is the home of the column, and these galleries that are common in the Lombard churches are probably derived from this source. On the other hand, the treatment of the wall with upright shallow pilasters, the so-called "Lisenen," though it occurs also in Lombardy, may be of native German origin as a derivation from the pilaster of classical Roman monuments. The towers, when circular, are crowned with conical caps, but the square ones end with the characteristic German "Helm," the four walls terminating in high-pitched gables, and a pyramidal roof being adjusted to them.

Internally the chief form of decoration is the mural or ceiling painting. The flat wooden roof of St. Michael, Hildesheim, exhibits an elaborate painted enrichment wherein a Tree of Jesse, bearing in conventional acanthus scrolls medallions containing portraits of the ancestors of Christ, intervenes between a picture of the Fall, in which the nudes of Adam and Eve are of notable excellence for the time, and a representation of the Annunciation, beyond which again at the altar end of the whole there appears a monumental figure of Christ enthroned. These central subjects that run from west to east are framed by a series of panels in which are figures of prophets who foretold the birth of Christ, and there are also two outer borders. "As a whole," Woltmann has said, "the ceiling forms one of

the foremost examples of severe architectural arrangement and artistic distribution in the whole range of mediæval painting. The principal figures rise to a noble dignity, the drawing is assured and light . . . the pure colouring," largely in the traditional mediæval blue and red, "is harmonious and powerful."

Of mural painting in the twelfth century several cycles survive, though, of course, rather drastically restored. The most extensive is the one in the choir and transept of the cathedral at Brunswick; the most complete and interesting that in the ancient chapter-house of the now secularised monastery of Brauweiler near Cologne, where the subjects are drawn from the tenth chapter of Hebrews, and the victory of faith is displayed in the acts and personages of the Old Testament and of Early Christian times. The whole is a sermon in pictures of a very effective kind, and the figure drawing is for the date—about 1150 A.D.—astonishingly good. The small double church of Schwarz-Rheindorf, opposite Bonn, still of the twelfth century, contains a series from the prophecies of Ezechiel. Other ecclesiastical buildings in Cologne and its neighbourhood exhibit extensive remains of mural paintings, but these are for the most part somewhat later, and betray the characteristics of the Gothic style which in the thirteenth century made its entry into Germany.

In architecture German Gothic is far from possessing the interest of German Romanesque. The latter, with its severe discipline and rational order, suited, as we have seen, the national temper, and was, moreover, a perfect expression of the monastic spirit as this was displayed in the great conventual establishments. The expression was, indeed, so full and free that at the time when, in the middle of the twelfth century, the Gothic spirit was beginning to assert itself in central France, Germany was so well supplied with magnificent abbey churches in the round-arched style that there was little place for others. In connection with this it may be noted that one reason for the rapid develop-

ment of Gothic architecture in the Île de France and Picardy in the twelfth century was the fact that this particular district of Europe had not been the seat of any notable building activity in the Romanesque period, so that the field was open for a new development.

In Germany the thirteenth century was well advanced before the Gothic style obtained a footing in the country. One of the earliest of its monuments is the Cathedral of Magdeburg, which was in great part inspired by Laon; and it is curious to find the style making its first appearance in Germany so far from the frontier of the land where it had its birth. In the Rhineland, which borders on France, the choir of St. Gereon at Cologne and the beautiful Liebfrauenkirche at Trier—the latter with St. Elizabeth at Marburg, the first German church carried out consistently in the Gothic style—are original creations, French in their details, but in their general scheme independent of Gallic models. The interior of the Trier church, of a circular form strange to French Gothic, is of singular beauty. On the other hand, the Cathedral of Cologne is distinctly French in its general scheme, which is closely modelled on that of Amiens. The proportions of the edifice are so vast, and the height of its western spires, completed in 1880, so prodigious, that it will always be an imposing monument, but it is devoid of the charm and poetry of the French and English and Spanish churches. The style is formally pure, but produces a mechanical impression.

Some of the later Gothic churches of the fourteenth century, such as St. Lorenz at Nuremberg, or St. Sebaldus at the same place, begun in the thirteenth century, are much more picturesque in their exteriors, and have besides, what is lacking at Cologne, a considerable display of decorative sculpture. Some of the best examples of this are on the famous Gothic fountain, the "Schöne Brunnen" of the late thirteenth century. For Gothic sculpture in Germany, Nuremberg is only surpassed by Bamberg, where, in the so-called "Adam's Portal," there is the best display

in the whole country. The master here was evidently inspired from Rheims, and it needs hardly to be said that in this particular department neither Germany nor any other land has anything to show comparable with the display on French churches such as Rheims or Amiens. As a fact, the best architectural sculpture of the period in Germany is Gothic in date, but in style belongs still to the earlier Romanesque epoch. Such sculpture is to be found in Saxony in the interior of the church at Wechselburg and in the famous portal of the church at Freiberg in the Erzgebirge known as the "Golden Gate." This dates from about the second quarter of the thirteenth century, but so far as the architectural setting of the figures is concerned, and in certain characteristics of the figures themselves, the work is still Romanesque, and there is no trace in the former of the pointed arch nor in the latter of the lightness and grace of Gothic figures. The relation between the architecture and the figures is, however, so good that the whole has been pronounced the most perfect of mediæval portals, for all Romanesque gates by its side look poor, all Gothic ones overladen with details.

It is not to German architecture that we look for expression in the forms of Gothic art. The spirit of that great movement found its outcome in Germany in a phase of the art of painting that is of much interest and beauty. German painting has already been noticed in the forms of manuscript illumination and of Romanesque wall and ceiling decoration. The churches of the same period were also well supplied with altar fronts and altar backs, shrines, reliquaries, screens, and the like, in which painted wooden panels found their place. In the fourteenth century, in more than one part of Germany, notably at Prague, Nuremberg, and Cologne, these panels received new importance, and became veritable pictures of independent value. This was notably the case with the productions of what is known as the School of Cologne, dating in the last part of the fourteenth and the first part of the succeeding

century. In calling this work Gothic, it is meant that it is inspired by the same spirit that manifested itself in the French cathedrals from the middle of the twelfth century onwards. The spirit was one of grace, tenderness, and refinement, and was embodied characteristically in the figure of St. Louis of France. It is the same bright and winning temper that in Italy was incorporated in the person of Francis of Assisi, and that inspired the essentially Gothic art of Giotto and Andrea Pisano. Here in Germany this new movement in painting was connected with a religious revival led by the so-called "Gottesfreunde," of whom Ekkehart and Tauler, both of whom preached in the Rhineland in the fourteenth century, were the most famous. They were mystics who sought in religion for a more intimate personal relation between man and God and suffused the whole being with ecstatic love. They were visionaries, and were visited by celestial apparitions, which, true to the spirit of the age, were always forms of beauty. The grotesque, the hideous, and the terrible, that at a later as at an earlier date held such fascination for the northern fancy, never haunted them, and only angelic shapes embosomed in flowers floated before their inward eyes.

In close correspondence with the peculiar tone of religious feeling thus indicated, we find at Cologne in the fourteenth and early fifteenth centuries a school of painting remarkable for the beauty, tenderness, and quiet but intense religious feeling of its productions.

Its chief activity in the latter part of the fourteenth century is popularly associated with the name of one Wilhelm of Herle, who is mentioned in contemporary documents as the best master in German lands. It is probably safe to ascribe, if not to him, at any rate to his successor, Herman Wynrich, and others of his school, the best pieces of the time, such as the "Clara" altar in the Cathedral at Cologne, or the "Crucified with Attendant Saints" and the "Madonna with the Bean Flower" in the

Museum there. The last is the best example of the school for its idyllic charm and the grace and delicacy of design and execution. The Madonna with her round face and tiny mouth, and the Child that caresses her chin with its infant hand, might have been seen in a mystic vision of Heinrich Suso, the follower of Ekkehart and Tauler, and the same may be said of those sacred idylls in which the Madonna is pictured in a flower-garden attended by a bevy of angels engaged in music or in playful occupations. A Madonna with angels of this kind in the Town Museum at Frankfort is a classic example of the style.

A "Crucifixion" with a large number of figures in the Museum at Cologne exhibits this same idyllic quality combined with certain other elements which for good or ill become characteristic of all the later German painting of the mediæval period. These elements are more pronounced in the work of the chief German master of the second quarter of the fifteenth century, Stephan Lochner from Constanz, who settled in Cologne, and died there in 1452. In Albrecht Dürer's diary there is an often-quoted entry, "Item, I paid two white pennies to see the picture which Master Stephan in Cologne had made." This picture, a triptych, is now preserved in the Cathedral, and presents the Madonna and Child adored by a large company of male and female saints. In two other works ascribed to Lochner, a large standing Madonna holding in the left hand a vetch, in the Archiepiscopal Museum at Cologne, and a Madonna with Angels making music in a rose-garden, in the Cologne Museum, the older purely idyllic feeling is combined with firmer drawing and more solid modelling than in the earlier works of the school, but in the Dombild there is associated with these qualities a pronounced realism in details, especially in costume, which is prophetic of tendencies that were to show themselves conspicuously in the future. Here, accordingly, will be a suitable place to pause for a moment to consider the qualities of the German painting of the period as a whole, before we go on to the

work of Dürer and Holbein in which this phase of the national art finds its culmination.

The development of this German school of the later Middle Ages was contemporary with that of the Italian schools south of the Alps, and as Italian characteristics are well known, they may be used to bring out by contrast those of the schools of the North. Meier-Graefe, in his study of Modern Art, has said that "the essential genius of German art expressed itself rather in design than in painting" . . . it "is deficient in the pictorial instinct. The German is a musician, a poet, but not a painter." Support may certainly be found for this somewhat sweeping statement in the fact that in the seventeenth century German painting passed almost wholly out of existence as a national art, while in Holland and Belgium the art developed on purely pictorial lines to the most splendid results. There were, as will be seen, external reasons for this, but all the same the fact does suggest that painting was not an art appealing specially to the æsthetic ambition of the Teuton. When German painting in the middle of the fifteenth century advances beyond these still primitive essays, its disadvantages and shortcomings, when compared with those of the art of Italy, are only too apparent. It was not, however, the fault of the German artist that his sense of beauty in the human form was not nourished like that of the Florentine on the remains and traditions of classical art, since opportunities for study of the kind were hardly available north of the Alps; nor can we do anything but commiserate the Northerner when we contrast the opulent life of a city like Venice, full of mirth, light, and colour, or the court of a splendour-loving prince proud of the men of genius he maintained at his table, with the greyer and more homely surroundings of an inland German town. "Oh, how I shall freeze after this sunshine!" writes Albrecht Dürer from Venice. "Here I am a gentleman—at home only a parasite."

In spite of these disadvantages, however, qualities were

developed in the North that at times more than balance the fascinations of the alluring Italian style, though the merits in question are merits of design rather than distinctively pictorial. Northern painting exhibits in some of its phases, as in the early Cologne pictures, a purity of religious emotion, an idyllic sweetness, and a devotional temper, which equal or even surpass anything found in Italy, but more constant qualities are dramatic force and intellectual profundity, that one would expect to find in the art of a people destined to such eminence in the higher music and in philosophy. German also, or rather, more generally, northern, is a delight in the grotesque and even the terrible, the impression of which the Northerner is fond of alleviating by a touch of humour. Precision of execution and conscientious adherence to truth in rendering of details is also a characteristic which the German national temper made almost inevitable. These last two groups of qualities are also the source of certain shortcomings in the German art of the period. The feeling for dramatic force and expressiveness leads to over-vehemence in actions and to forced facial expression amounting to grimace. A hardness, almost a brutality, of feeling seems here to be evinced. In the frequent scenes of martyrdom, for example, the features of executioners are shown as hideously distorted with passion. Again, the feeling for exactness in detail and delight in precise handling result too often in excess of elaboration in matters that are intrinsically unimportant, and to a hardness in the rendering of often meticulous accessories that destroys breadth and unity of effect and gives to compositions an unduly crowded appearance.

In the painted and engraved work of Albrecht Dürer these characteristics of the art of his age and race come out into marked prominence. Dürer's intellectual depth, fertility of invention, and dramatic power, were freely recognised by the Italians of his day, and their appreciation of these qualities is shown by the fact that several of them,

even Raphael himself, borrowed Dürer's designs for their own scriptural renderings. It is reported, however, of Michelangelo that, in conversation with Vittoria Colonna, he blamed the northern masters because, he said, "They endeavour in one and the same picture to represent a mass of objects all with the same perfection, though one single one would in each case have been sufficient," and he went on to mention Dürer by name: "So true is this that even if Albert Dürer himself, a man of fine feeling and accomplished skill in his own line, tries to deceive me with a work painted in imitation of the Italian style, I know as soon as my eye falls upon it that it has neither been painted in Italy nor by an Italian." A story is told to much the same effect about a conversation between Titian and some German visitors to Venice. It is very noteworthy that in later life Dürer became conscious of this shortcoming that he shared with his school, and told a friend that, as a young man, he had been fond of pictures full of variety and crowded with figures, and in the case of his own works had always looked to the many-sidedness of a piece. In later life, however, he had begun to observe nature and to portray it in its essential aspect (*nativa facies*), and had come to see that it was this simplicity which was the highest charm of art. Hence it followed that he no longer looked at his early pictures with satisfaction, but rather with a sense of his own deficiencies.

In Dürer's life and work German art culminates. Serious and thoughtful in disposition, firm, precise, and self-reliant in every act and word, he has left us a body of work, painted, engraved, and in the form of drawings, that represents the German school at its best, both in the quality of philosophical depth and in thoroughness and perfection of execution. Many of his best paintings, such as the marvellous "Adoration of the Trinity" at Vienna, or the "Magi" at the Uffizi, are amenable to the criticism of Michelangelo and Titian, but in the small "Christ on the Cross" at Dresden, and the monumental "Four Apostles" at Munich,

his characteristic qualities are virtues without their corresponding faults. Of the former "gem" Crowe and Cavalcaselle write: "The flesh is treated with a soft blending and with a firmness of touch and richness of enamel almost unrivalled; and such is the minuteness of the detail that we can see the hairs on the frame and the reflection in the eyes"; but they also pay it a tribute from the highest possible artistic standpoint in the words, "For proportion, power, life, and noble character, this exquisite piece rivals the creations of Leonardo da Vinci." The famous figure of St. Paul in the "Four Apostles," his latest picture, is conceived with a breadth and grandeur not surpassed by any Italian master of the sixteenth century. It is the design of Masaccio with the added qualities due to a century of technical advance.

With the public in general Dürer's fame rests rather on his engraved work than on his pictures. A word is necessary on the engraver's art, so important in Germany. Dürer employed the two media that have always been in most common use, the wood block and the copper plate. It needs hardly to be said that wood blocks were cut and designs incised on plates of copper or bronze long before there was any idea of making what we call a "print." For the print in the modern sense what was needed before all things was paper. Now the manufacture of paper depended on the supply of linen rags, and the general use of body linen was a fashion of the fourteenth century. When linen was commonly worn and in due time reduced to the condition of rags, paper-mills came to be established in large numbers, and this was the case in the latter half of that century. For copper-plate printing, where the ink has to be drawn out from the incised grooves by the softened paper pressed into them, a special quality of ink was necessary, and this again was not supplied till the same epoch. Wood blocks had been in use in earlier centuries for the printing of designs on textiles, and when sheets of paper became available it was a simple matter to print by the same process on these,

the wood block for the textile prints being necessarily cut in reverse. The earlier engraved copper or bronze plate, on the other hand, was a positive—that is, the design was incised on it to show as it was, the lines for greater clearness being often, though not always, filled in with a black composition (niello-work). If such a plate were prepared for printing, it would need to be made as a negative, with all the design in reverse, and this introduced a difficulty not present in the case of the wood block, the result being that the woodcut appeared sooner as an artistic product than the copper-plate print. By the middle of the fifteenth century, however, both were in use.

It has often been discussed whether the invention of engraving was due to Italy or Germany, and no absolute certainty on the matter is to be obtained. Germany, however, was the first home of printing, and, as engraving and printing are arts closely allied, priority in the former also probably belongs north of the Alps. In the Germany of the fifteenth century the art of engraving rapidly assumed great importance, partly because of its connection with printing, and also to a great extent owing to the altered religious and social condition of the country. The Reformation represented an emancipation of the human intellect, and produced activity of thought with a thirst for knowledge; the Bible was printed and read in the vernacular; a controversial literature sprang up. All this created a demand, or at any rate prepared a place, for a readily-accessible form of art appealing to the people at large, and this was supplied by the copper-plate print or the woodcut, introduced as illustrative matter into the Bible or other printed books, or sold apart as was the habit with Albrecht Dürer. Holbein's early work at Basel was largely for the illustration and adornment of books. Dürer was preceded, surrounded, and followed by masters who practised the art either exclusively or side by side with painting, and among these it is only necessary to mention a few names such as those of Martin Schongauer, Hans

Burgkmair the elder, Georg Penz, Hans Sebald Beham, 1500–1550, and a little later Virgil Solis, the best German engraver of ornament of the sixteenth century.

The number of Dürer's engravings is greater than that of his paintings, and there can only be mentioned here, *inter alia*, his four series from the Passion of Christ, and the large woodcuts from the Apocalypse and from the Life of Mary, to which must be added the considerable number of his separate plates. Besides the engravings and pictures, Dürer's drawings and water-colours afford material for prolonged study.

A glance at five of Dürer's more important copper-plate engravings will suffice to exhibit some of the characteristics of his style. We may select the "Greater Fortune" of about 1500, the "Adam and Eve" of 1504, and the three plates, probably intended for a series illustrating the "Four Temperaments," the "St. Jerome in his Cell," the "Knight and Death," and the "Melancholia," of 1513–1514. In the first plate we have the combination of a realistic rendering, uncompromising in its ugliness, of the female nude as presented by a powerful but coarsely-moulded German model, with the most exquisite delicacy of artistic touch on the magnificent wings of the figure, where the feathers are indicated as only Dürer's graver could show them. In contrast to this essentially northern creation, we find in the "Adam and Eve," together with the same perfection in detail, a distinct effort to achieve formal beauty in the nude form, male and female, and we are reminded that Dürer very early in his career came under Italian influence, and was in this way brought into contact with the classical ideas of beauty. In the paintings of "Adam" and "Eve," in the Pitti at Florence and at Madrid, he went still farther in his concession to the ideal of formal beauty as it was understood south of the Alps, and in comparison with so much that he has left of more distinctly northern character these exceptional pieces are elements of much interest in his work.

Of the three other plates, the " St. Jerome in his Cell " represents the " lymphatic " temperament, and there is a delightful warmth of true German *Gemüthlichkeit* in the pleasant, homelike interior filled with sunlight, where the lion and a pet dog are dozing together on the floor. The " Knight " in the familiar plate, mounted on a magnificent charger inspired by the horse of the Colleoni monument at Venice, is the type of the " sanguine " temper, while the name " Melencolia," inscribed on the third plate with the number " I," sufficiently indicates its theme. No work of art is better known or has given rise to more comments. It is universally recognised as charged with that profundity of meaning which is characteristic of the greater productions of the genius of the North. What is the intention, however, of this female genius of superb mould, heavily robed, oak crowned, and equipped with wings as finely rendered as those of the " Greater Fortune " herself; who rests her head upon her hand with an expression of brooding sadness? Of what significance in relation to her position and mood are all those tools and appliances of work with which she is encompassed? Do the comet and the rainbow in the sky convey any hint of the artist's thought? Among the appliances just mentioned there appears above the head of the genius an abacus or board with rows of numerals across it. A discovery made in connection with these last has given a key to the piece. The numbers appear to indicate the date of the death of the artist's mother, to whom, as a man of strong family affection, he was tenderly attached. Dürer himself was above all things the craftsman, delighting in the use of tools which he guided by that inimitable hand of which a contemporary said that " Nothing more fine could be seen." His mind was as fertile in the invention of motives as his fingers were skilful in carrying them out; and the intention of the " Melancholia " is, no doubt, the portrayal of the mood of the indefatigable creator on whom has come a paralysing sorrow, and who pauses in the midst of a productive activity to ask himself what is the good

of it all, since there is no work, nor device, nor knowledge, nor wisdom in the grave where the loved one now rests, and whither all must come.

In his artistic equipment, as well as in his career, Hans Holbein, 1497–1543, differs markedly from his elder contemporary, Dürer. He was the son of an excellent painter of Augsburg, a town which rivalled Nuremberg in culture and surpassed it in wealth and commercial importance, but his life was spent elsewhere than in his native city, and we find him first in Basel and Luzern, and then for the greater part of his later life in London, where from 1532 to 1543 he was highly esteemed, holding the post of court painter to Henry VIII. In philosophic depth he was not Dürer's equal, but he possessed a quality to which the serious mind of Albrecht never aspired or descended, the quality of humour, which found its outcome in satiric drawings and prints. He used this power in the religious controversies of the time, and whereas Dürer, though an enthusiastic admirer of Martin Luther, remained in religion as in art a mediævalist, Holbein openly employed his talents in the service of Protestantism. In his famous series of woodcuts on the traditional German theme of the intrusion of Death into all the relations of human life, he is scathing in his satire on Pope and Cardinal, on Abbot, Monk, and Nun, but treats the secular clergy, the clergy of Protestantism, with respect and sympathy. His artistic repertory also differed from Dürer's in that he was a child of the Renaissance, and one of his early works was the decoration of the façade of a house in Luzern with figures and ornaments of the Renaissance type. In his designs for title-pages and the like and for decorative work in general, he uses only the newly-revived classical motives.

One picture, a large votive piece on traditional ecclesiastical lines, in ducal ownership at Darmstadt, represents the Catholic Burgomaster of Basel, Jacob Mayer, with his family, adoring the Madonna, and this is the most im-

portant picture painted in the mediæval style in the German school. Holbein's fame rests, however, chiefly on his incomparable series of portraits, a form of art of a more distinctively modern type. No doubt, from the point of view of the seventeenth century, Holbein's painting, like that of Dürer, is still archaic, but success in portraiture depends not only on technical qualities in brushwork, but on the power of analysing human character and of conveying the truth of it with force and fullness under the form of beauty. So envisaged, Holbein stands in the very foremost rank, and yields place to none of the very greatest masters of the art. In his best work he combines a feeling for breadth in the treatment of his heads, with the old German delight in the detail of accessories, and in that form of portraiture in which the figure appears in appropriate surroundings, Holbein is pre-eminent. Nothing from his brush surpasses the portrait at Berlin of the German merchant in London, Georg Gyze, one of his later works. The merchant, richly attired, is at the table in his office, and the face is modelled in cool light, the character being given by the firm outlines round the features and the self-reliant expression in the eyes that are turned in the direction of the spectator. The table, covered with a richly-coloured Oriental cloth, and the shelves round the wood-lined walls, are furnished with office impedimenta—seals, inkstand, cash-box, ledger, string-holder, and the like—with parchments and letters galore, all precise in detail as in a photograph, but so artistically treated that they clothe the figure without in the least detracting from its pre-eminence. A note of beauty, which illustrates the pictorial side of Holbein's genius, is furnished by a Venetian glass vase on the corner of the table, in which are some sprays of carnation, the rendering of which, in its combination of softness and fluidity with decision, is sufficient of itself to prove the artist a true painter, as well as an unsurpassed master of delineation. Holbein's drawings for his portraits in oil, many of which are at Windsor and in other British collections, depend for their effect on his use

of a firm but sensitive and expressive line, of which artistic medium he was perhaps the greatest master that the history of the graphic art reveals.

In many parts of Germany, before and after Dürer and Holbein, as well as during their lifetime, there were painters of sufficient eminence to deserve a word. The interval between the Cologne School and Dürer is filled by the notable figure of Martin Schongauer of Colmar, *c.* 1445–1491, productive as an engraver and the author also of one or two excellent oil paintings. A life-sized Madonna and Child in a rose arbour at Colmar has much of the tenderness of the Cologne masters, while in many of the master's prints there is the vehemence in action and expression, the leaning towards the grotesque and terrible, that we have seen to be characteristic of the German design of the period. After the two great masters, the German painter of most pronounced genius was the Rhinelander, Matthias Grünewald, who died about 1530. He was an imaginative artist, a mystic like the older men of his district, but in his visions there mingled with sights of beauty sights of terror. Woermann writes of his soft melting effects of light and shade full of poetical suggestion, and of his emotional design with its passion and religious intensity. Other painters and engravers carry on their art in different parts of Germany, and among them may be mentioned Hans Baldung Grien, Lukas Cranach the elder, Heinrich Aldegrever, and Bartholomäus Bruyn of Cologne, 1493–1555, a painter of portraits whose work is of interest as prefiguring the broad but naturalistic productions of the Dutch portraitists of a later time. There is among them, however, no sign of advance, and indeed the painting of the second half of the sixteenth century rapidly loses its national character, and, as in the case with the work of the master last mentioned, goes off into that imitation of Italian models already in fashion in Flanders. German artists, too, have now taken to leave their own country, as Holbein left it, and to seek their fortunes in other lands. At the very end of the

century, however, the German note is struck once more with remarkable effect.

About the year 1600 there appeared at Rome a Frankfort painter, Adam Elsheimer, moulded on influences derived from Grünewald, who had migrated to Italy, but had brought with him some of the distinctive qualities of his native art. He painted small pictures exquisitely finished, in which magical effects of light and shade seem to prefigure Rembrandt, and, disposing his figures in a landscape setting fully as important as the figures themselves, he infused into his works a homely, intimate feeling that arrested attention. The Italians, accustomed at the time to empty and pretentious productions of the academic schools, were fascinated by the direct appeal of these simple but assured northern designs, and Elsheimer is as notable in bringing out the contrast between German and Italian work as in exhibiting in his own person the fact that painting had ceased for a time to be productive on German soil. It is a fact that during the seventeenth and eighteenth centuries the history of painting in Germany is almost a blank. The native artists who worked there were quite of the third rank, and the home commissions were largely in the hands of foreigners from Holland or from Italy, while the better German artists, like Elsheimer, lived abroad. Sir Peter Lely, from Soest in Westphalia, Sir Godfrey Kneller, from Lübeck, will occur to the British reader, as they both worked in England in this period. Raphael Mengs was the most notable German painter of the eighteenth century, and his sphere of activity was Italy and Spain. Only at the end of that century does a genuinely German artist make his appearance once more, and characteristically enough, he was an engraver rather than a painter. The reference is to Daniel Chodowiecki, 1726–1809, who has been described as "the first independent and nationally-minded German artist of the modern age." The beginning of the nineteenth century marks the opening of this modern age, of which notice will subsequently be taken.

The eclipse here noted has been explained by the impoverishment of the country owing partly to the religious disturbances and partly to the alteration in the routes and emporia of commerce through the opening up of transoceanic waterways; by the loss of the old ecclesiastical patronage in Protestant lands, and, above all, by the Thirty Years War. It does not follow, however, that all artistic activity was at a standstill. Architecture and architectural decoration passed through well-marked phases exemplified in numerous monuments throughout the length and breadth of the land. The division into so many quasi-independent states was in its way in favour of art, for each petty princeling had his capital and his "Residenz," which he desired to make a conspicuous centre, and there was a rivalry in forming galleries of works of painting and sculpture, and in the encouragement of artistic manufactures, such as the porcelain at Meissen near Dresden. In the Catholic South the counter-reformation, largely under the influence of the Jesuits, led to fresh demands in building and decoration. All this patronage, however, had little influence on the country, for the demands were met largely by the work of foreigners, and the style and models in vogue were not German, but Italian, French, or Flemish. Frederick the Great favoured French fashions in art, and his acquisition of many of the masterpieces of Watteau is a significant fact of the times. A brief notice of the architecture and decoration of these centuries will be all that is necessary.

If Dürer, as we have seen, be still mediæval, while Holbein, his junior by a quarter of a century, is thoroughly imbued with the spirit of the Renaissance, we can fix an approximate date for the coming in of the Italian style, which shows itself in some extant works of the early part of the sixteenth century. In the domain of sculpture the new influence makes itself felt especially at Nuremberg, and in a series of works partly in wood and partly in stone and bronze by the masters Veit Stoss, 1438–1533, and Adam

Kraft, *c.* 1445–1509, we can trace the mingling of late Gothic and Renaissance elements, and can witness the victory of the latter in the bronze work of Peter Vischer the elder, who died in 1529. The series of reliefs in stone of the Stations of the Cross at Nuremberg, by Adam Kraft, have made visitors to that city familiar with the dramatic force and quaint realism of this last of the mediæval sculptors of his country. The well-known Shrine of St. Sebaldus in the church of that name at Nuremberg, the work of Peter Vischer and his sons, is an elaborate production of bronze casting in which Gothic reminiscences combine with figure work and ornaments of a distinctively Renaissance type. A comparison has often been made between this work and the Ghiberti Gates at Florence of nearly a century earlier, and the monument, which was finished in 1519, is one of the very finest single works of art that Germany has produced. Vischer's noble bronze statues of King Arthur and Theodoric for the tomb of Maximilian I at Innsbruck are works of greater pretension still, for they are over life-size and exhibit a classical ease of pose with admirable technical execution. A large number of less important funeral monuments issued also from the prolific bronze foundry of the Vischer family and are to be seen in different parts of Germany.

In architecture the German Renaissance is well represented in the finely-proportioned and graceful porch of the Rathaus at Cologne of 1569, and in the more imposing monuments of the Jesuit Church of St. Michael at Munich, and the two blocks of the castle buildings at Heidelberg that meet at right angles in the north-east corner of the whole complexus, and date from 1544 to 1559. The comparatively pure Renaissance forms seen best in the Cologne building soon, however, give place to those of a fuller, looser, more fantastic kind, which characterise the style known in Germany as "Barock." In this style the ornament has burst the bonds that kept it in due subordination to structure, and has laid violent hands on the whole which it

proceeds to dominate. Volutes, cartouches, and other inorganic forms are substituted for the orthodox classical details, though the general forms of the Italian Renaissance are still preserved. The "Friedrichsbau" of the Heidelberg Castle, 1601–1607, is a good example of the style in its more dignified aspect, while the side elevation of Lüder of Bentheim's Rathaus at Bremen exhibits it in its freer and more fanciful vein. The "Barock" style partly corresponds to that of Louis XIV in France, and it is followed in Germany by the lighter, more graceful, but at the same time frivolous style known as "Rokoko," or, to use French nomenclature, the style Louis XV. A building that exhibits the wayward grace of the Rokoko, though it precedes the appearance of this style and is really Barock, is Pöppelmann's attractive "Zwinger" at Dresden, completed in 1722. This is an arrangement of pavilions connected by galleries enclosing a space laid out for festal uses, and is one of the most charming architectural morsels presented to the public in modern times. Numerous buildings, public and private, of less pretension represent the later Rokoko style of the eighteenth century, as well as the so-called "Zopf" style which succeeded it and corresponds to what we term the style Louis XVI. Potsdam is specially well supplied with examples.

It must not be supposed, however, that these fanciful styles entirely dominated German architecture between 1600 and 1800. A classical style of far greater simplicity and dignity is represented at Berlin by that singularly noble edifice, the Zeughaus or Arsenal. It was finished in 1706, and it owes not a little of its æsthetic charm to the sculptured decoration due to the genius of Andreas Schlüter, 1664–1714. The masks of dying warriors round the inner court are among the most famous works of the kind, but the extensive groups and figures of a military order on the upper part of the façade are equally expressive and are most happy in their decorative effect. Schlüter is responsible as architect for the main façades of the royal Schloss at Berlin,

though his fame is better supported by the fine equestrian statue on its effective pedestal of the Great Elector, which stands opposite to it.

It was stated at the outset that Germany had borne her part in the various artistic movements that marked the nineteenth century, and she is at present conscientiously endeavouring to assimilate the highly-spiced food offered in the twentieth by "l'Art Nouveau" in architecture and decoration, and by the Italian Futurists and their like in connection with the long-suffering art of painting. In no important department, save perhaps that of monumental wall painting in fresco, can Germany be said to have taken the lead, though in the latest phase of religious art, the naturalistic rendering of the scenes of the sacred story, the work of Fitz von Uhde may claim a position of importance. For the rest, the country has in the main followed the fashions of the hour, answering in the early part of the century to the impulse of the classical and the romantic revivals, acquiescing for long periods in domestic architecture and decoration of a mid-Victorian dullness, awakening nearer our own time to the stimulus of impressionism in painting and sculpture, and making a distinct mark in the essentially modern art of illustrated journalism. The invention by Senefelder in 1798 of the process of lithography stands to the credit of Germany.

In architecture the severity of classicism in Hamilton's High School at Edinburgh, and its modified expression in St. George's Hall, Liverpool, have been matched in the one case by von Klenze's Propulæa at Munich and his Walhalla above the Danube, in the other by Schinkel's Old Museum and Royal Theatre House at Berlin; but the Gothic revival, on the other hand, was much less conspicuous in Germany than among ourselves. During the middle part and the second half of the nineteenth century the dominant ecclecticism has prevailed there as in other lands, and some fine Renaissance buildings, such as Semper's Opera House and Picture Gallery at Dresden and Neureuther's Academy of

Arts at Munich, can be mentioned. In domestic architecture the period produced very feeble results, and the unsuccessful Maximiliansstrasse at Munich may be quoted as an example. After the war of 1870–1871 there was great activity in building, but the majority of the domestic and semi-public structures, in a pretentious Renaissance style with bad detail, are most unpleasing. Those in the Cologne "Ring," the line of the older fortifications, are particularly distasteful, and among monumental buildings the new Dom at Berlin, which with the western end of the Cathedral at Cologne may be regarded as a votive offering for the victory over France, is one of the most oppressively Philistine structures with which the earth was ever weighted. In more recent years the revival in domestic architecture, which in England owes so much to the genius of Norman Shaw, has spread to Germany, and the small country house or suburban villa may be seen now represented in some parts in simple and pleasing artistic forms. Of greater importance is the real originality and power shown in urban structures in Berlin by the late Alfred Messel, whose monumental edifice for the great Wertheim emporium in the Leipziger Strasse is one of the most promising signs of genuine renewal of life in modern street architecture.

In the department of sculpture a modified classical style was represented early in the century by Gottfried Schadow, whose chief pupil, Christian Rauch, 1777–1857, was the artist of the admirable memorial to Frederick the Great at the foot of Unter den Linden in Berlin, one of the best works of the kind in the modern age. Several vast monuments of a somewhat obtrusively patriotic kind appeal to pride in the Fatherland. The example set in 1848 by Schwanthaler's gigantic "Bavaria" in front of Klenze's Ruhmeshalle in Munich has been followed in the "Germania" overlooking the Rhine, and the "Hermann" on the Teutoburger Wald, both erected a few years after the Franco-Prussian War. The glorification of the Hohenzollerns in the notorious Siegesallee in the Thiergarten at

Berlin is recognised by the Germans themselves as an artistic mistake.

Far more intimate in its appeal to modern feeling is the work of some of the more recent sculptors, of whom Adolf Hildebrand of Munich is typical. Of the numerous monuments to Prince Bismarck in Germany Hildebrand's equestrian statue at Bremen in its simplicity and strength is quite the best, and in many of their works these sculptors strike the mean between severe monumentality and the picturesque style, which the influence of the art of painting in its recent developments renders increasingly attractive to the public. As a bold exposition of this style in its extremest manifestations the much-talked-of Beethoven monument by Max Klinger in Leipzig claims a word. The nude marble figure of the creator of the Choral Symphony with figured mantle over his knees is seated on a fantastic throne covered with symbolic enrichment, and the effect of the abundant detail is enhanced by a bold polychromy. Dr. Woermann pronounces it to be at any rate "one of the most independent and expressive creations of the German art of the nineteenth century."

German painting in the nineteenth century was influenced by the romantic and classical revivals, and had as a moving impulse the new stir of national life due to the heroic struggle against Napoleon. An early phase of it is specially interesting to us in this country, as it preceded on similar lines our own pre-Raffaelite movement.

In the early years of the century a small company of young German painters settled at Rome in an abandoned monastery, where they sought to reconstitute the life and work of the painters of the earlier religious schools. The name "Nazarene" was applied to them in bantering fashion, and the most characteristic figure was that of Friedrich Overbeck, 1789–1869. A devoted adherent of the Roman Catholic Church, he was intensely religious, and his pictures breathe the same spirit of quiet and retiring piety that marks the early school of Cologne. "Art is to me,"

he wrote once, " a harp on which I would fain hear always sounding hymns to the praise of the Lord." The " Nazarenes " were romanticists of the type that surrenders itself to idealism, but recognises no attraction in nature and the things of the real world. Hence their art drew its motives at second hand from the works of the older masters. This secured a certain look of style in the compositions; but, on the other hand, the figures lacked individual character, and the colouring was pale, flat, and conventional. One good piece of work, however, the enthusiasts accomplished early in their career, which laid the art of their country under a considerable obligation. In 1815 they re-introduced the technique of fresco-painting, which had been abandoned since the death of Raphael Mengs in 1779, and, with the aid of one of Mengs's old journeymen, executed successfully in the true process a series of paintings in a room of the Casa Bartholdy on the Pincian at Rome. These paintings, from the story of Joseph, have been skilfully removed to the National Gallery at Berlin, where they are now in a good state of preservation. Modern German wall-painting, which has flourished through the century, had here its origin.

One of the chief representatives of this form of art was Peter Cornelius, who left the " Nazarenes " to become an important figure in the German painting in the first half of the century, and with him may be placed Schnorr von Carolsfeld and Wilhelm von Kaulbach. Vast areas of wall and roof in public buildings in Munich, Berlin, and other towns were covered with fresco paintings, some of classical, others of historical and romantic import, but the work on the whole is cold and " academic," and has generally been regarded even by the Germans themselves with more respect than affection. The work in general bears out what was said above about the non-pictorial character of German graphic art. Cornelius and von Kaulbach were designers rather than painters, and the same applies to other notable men of the period, such as Carstens, the earliest of the

modern school, 1754–1798, Moritz von Schwind, 1804–1871, and Genelli, while the later Adolf Menzel, 1815–1905, will probably live more by his illustrations than his pictures. The one painter of genius, who illumined his frescoes with the fire of art, was Alfred Rethel, 1816–1859, whose cycle from the life of Charles the Great, at Aachen, should be studied by all those who have been impressed by the artist's power in his well-known prints from the *Dance of Death*, wherein he gives a new and noble expression to an ancient German theme. He was a pupil of W. von Schadow, one of the "Nazarenes," who was, after Cornelius, the founder of the Düsseldorf School that flourished in the middle part of the nineteenth century. Another of von Schadow's pupils, Anselm Feuerbach, 1829–1889, presented classical scenes in a poetic dress, and is one of the few German painters of the period on whose works the artist of to-day looks with delight.

In the second half of the century the pictorial movement inspired by the French romanticists has been predominant over the academic orthodoxy of painters like Karl von Piloty of Munich, and names such as those of Hans von Marées, Hans Thoma, and Max Liebermann, who introduced to his countrymen the saner form of French impressionism, may be quoted from among a number too numerous to mention. The most popular artist of this "Richtung" is undoubtedly the Swiss painter, Arnold Böcklin, 1827–1901, whose romanticism, at times a little forced and self-conscious, has won for him a remarkable vogue. He is at any rate a painter, and his uncertainty in the matter of form, especially in the human figure, is veiled by a magic of colouring, especially in blues, and an execution that aims at a melting suggestive effect.

A final word is due to the contribution from the side of Germany to a form of religious art which aims at verisimilitude in the pictorial representation of the life of Christ by the abandonment of academic tradition and the use of local types, costumes, accessories, and setting. One form in

which this has been essayed, both in France and in Great Britain, is the elaboration of an Oriental *mise-en-scène* from a study of the Palestine of to-day. An experiment of a different kind was made by the German painter, Eduard von Gebhardt, whose "Last Supper," of 1870, is well known from reproductions. Here the scene is set in the Germany of the fifteenth century, for which in the nineteenth there seems hardly sufficient reason. More recently Fritz von Uhde has gone back to the fashion of Rembrandt, and, taking the actual scenes in town or country of the Germany of his own day, imagines Christ introduced into them, and dealing with those He meets as He dealt with His fellow-countrymen in Palestine. "Suffer Little Children to come unto Me," a picture at Leipzig, shows us the interior of a modern schoolroom in a small town, where the master stands in the background, while a group of children of all ages are gathered somewhat timidly near the chair on which a stranger, who has just entered, has taken his seat. This stranger is Christ, and we are made to see that He is gradually drawing the little ones to Himself by the magnetism of His personality. There are many pictures of the kind by the same hand, always serious and devout, but at the same time warm with human feeling. Their quality as works of art gives them a place as high as that which they claim as achievements in religious design.

If it be asked in conclusion, Are the Germans an artistic people? it may be said that with them expression in the arts of form is not spontaneous but rather forced. One of their own writers has been quoted as denying to them the pictorial instinct, and we may doubt whether the artistic instinct in general exists in them, though as a matter of set purpose they have "hacked their way through" to art to notable effect. There may be instanced the difference between the well-pondered compositions of the German graphic designers of the nineteenth century and the facile brush-work of Scottish artists, who, innocent of science,

have shown themselves in every touch born painters, to whom expression in colour and the handling of pigment is as natural as breathing. The Germans have done great things in the arts of which the world is proud, but they are not in the true sense an artistic race.

VI

GERMAN MUSIC

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I

Music is, of all the arts, perhaps the most impossible to explain in words; and writers on music deserve more sympathy than blame for the readiness with which they welcome topics that distract attention from the difficulties of purely musical questions. Where it is difficult to say anything without entering into principles and details which, to most readers, must seem purely technical, there is great temptation to discuss the first side-issue which connects the subject with ethics or politics, religion or science; and if all that has been written on the history of music were reduced to that portion of it in which the history is musical and the view of music is historical, the bulk would be conveniently small, but far from easy to read.

One of the most popular side-issues of musical history and criticism is the topic of racial or national characteristics. In any art it is inexhaustible and uncontrollable; we need only trace an artist's ancestry, deduce from it an interesting complexity of racial characteristics, select from these just what we happen to see in the not less interesting complexity of his art, and we are saved all difficulty in writing readably about his art, or in studying it at all. Beethoven is of Belgian extraction; some of Bach's ancestors settled in Hungary; the few classical composers of Germany whose German ancestry has never been explained away, have usually availed themselves of the fact that musicians

have more incentive to travel than most artists; and an essay on German music that should respect the terms of an Aliens' Restriction Act in any period of European politics whatever, would be sadly lacking in historic continuity. Fortunately, however, it is now universally recognised that the history of an art is not bound to deal with questions of nationality on political or ethnological principles. We know that the *genius loci* has more control over the plastic arts than politics or race. And still higher than the authority of the *genius loci* is the authority which spoken language has held over music even in periods where purely instrumental music is, as the professional jargon has it, most "absolute." This raises a difficult and perhaps controversial point, to which we must recur more than once; but at the outset it saves a world of trouble in defining German music. We need only decide to call that music German which has been written by composers to whom German was their first literary language, and not a single name in the long roll of accepted German classics will need explanation or apology. On no other condition is it possible to trace the workings of the German musical spirit with any real understanding of its scope.

Our subject is, then, the music of composers who spoke German in preference to any other literary language. In modern times this may be too broad a definition to be agreeable to the patriotism of distinguished Bohemians, Czechs, and Hungarians. Dvořák, for instance, showed himself far from gracious to the English university dons who offered him an address in German, beginning "Hochverehrter Herr." But Haydn left it to modern research to discover his Croatian nationality by an almost etymological comparison of the idioms of his melody with those of Croatian folk-music. We may leave open the question whether, as a grown man, Haydn knew the Croatian language much better than the average Irish member knows Erse; what is certain is, that whereas fate or inclination made Italians of his compatriots, Giornovichi (Jarnowickz)

and Tartini, he, under the famous Italian master, Porpora, grew up as a pioneer of German musical art-forms and became, by right of perfect mastery, the "Father of the Symphony," an art in which the Italians, though in a sense pioneers, achieved nothing. In his young days all musicians who claimed to common sense did their best to get an Italian training, whether at home or abroad. Patriotism had nothing to say in the matter; music was an Italian art, and Germany had the patience to learn it as such before she made it her own.

Nothing is more characteristic of German culture in general than the thoroughness with which not only the great classical German composers, but all the rank and file of German musical schools assimilated foreign music in every art-form. At no period in musical history has Germany shown any fear or jealousy of foreign domination, except when her serious musicians have felt compelled to protest against the domination of a debased and decadent art. If Rossini had been another Mozart, not a voice in Germany would have protested against the Rossini *furore* of the early nineteenth century; and even as it was, Weber, whose own prospects were injured by it, complained that "The worst of this rubbish is, that I am beginning to enjoy it myself." The main reason why German music has lost nothing by its periods of foreign domination, is that German composers have always been desperately eager to learn the principles of foreign musical forms, but have seldom been concerned to imitate foreign musical fashions in externals. Nothing in art, music, or literature is more intensely German than the style of J. S. Bach, and nothing is more characteristic of that style than his *Italian Concerto* and *French Overture;* but Bach means by *italienische Styl, stilo francese,* and similar terms, the results of an accurate study and prolonged experience in the handling of the forms of the Italian concerto and the French overture, in consequence of which he is a far greater master of their fullest resources than any one of their French and Italian originators. With

incredible accuracy he reproduces and develops every fibre that may serve to characterise their structure, until the best of the works that were his models appear comparatively formless; yet all his formal accuracy only serves to give him a strength of climax and freedom of expression compared to which his models appear inconclusive and stiff.

Here, then, we may be inclined to note the musical results of German thoroughness and system; but a salutary lesson awaits us in the contemporary work of Handel. Letters of naturalisation, no doubt, made a better Englishman of Handel than the British crown made of George I; and no doubt his early triumphs in Italy made him essentially an Italian musician; but to Bach, as to any contemporary gifted with common sense, this could only imply that Handel was a German musician who had exceptional advantages. Perhaps it was a result of these advantages, perhaps it was Handel's natural disposition—probably Handel's disposition helped him to take his advantages—but this fact remains, that Handel's art shows no system at all; unless we give the name of "system" to those methods that aim at the most rapid production of music in the greatest possible bulk, at whatever expense of quality. Handel, like Bach, uses Italian and French forms; but he leaves them as he finds them, even in some of the notorious cases in which he did not leave an old composer's actual work where he found it. If we desire to note something essentially German that is characteristic of both Handel and Bach, we must accept Handel's lack of system and lack of scruple; his uncritical acquiescence in the stagnant over-civilisation of Italian opera until sheer financial ruin drove him to the cultivation of oratorio; and his almost total lack of progress in style until, comparatively late in life, the experience of the capacity of English choirs inspired him. When we accept these facts and compare them with the facts of Bach's stay-at-home industry and self-improvement, the common element becomes obvious. Both these enormously productive artists were born improvisers; they

were able at a moment's notice to produce the music the moment required. And they were perfectly contented to do so. If the results of this disposition are to be permanently valuable, the conditions which demand music must be such as will give the musician a living wage and exercise his higher powers. It will avail him little that he is willing to begin " at the bottom of the ladder " if there is no ladder. But Germany has always provided a ladder for musicians, whether under the ancient system of aristocratic patronage or under her modern municipal organisation, or even, as shown by the career of J. S. Bach, under both together. That is one of the conditions on which a country holds its claim to be musical. The musician has always been necessary to German political economy; and it is arguable that Wagner was the first example on record of a German musician whose career was embittered by the fact that his projects were on too grand a scale to be reconciled with the civic duty of paying his way. Bach, then, like Handel, was a composer who earned a living wage by constantly writing for the occasion. The parish priest had to produce a sermon every Sunday; the organist had to produce a cantata. Cantatas are bulkier than sermons; it is almost a week's uninterrupted work to copy out the parts of the average Bach cantata, and evidently no organist would care to take a post where the choir had not a large repertoire in being. But he would be expected to add to the repertoire, and to add rapidly and regularly. The problems of composition on such conditions are the problems of improvising on paper—and there are certain very important differences between improvising on paper and improvising on an instrument. Every great German composer up to and including Mendelssohn has had a marvellous talent for both.

This point has always played a far greater part in musical history than is generally realised; at present let us note that this aspect of German talent has also always shown itself practically in methods as well as in results. The

"thorough and systematic" German seems, at least in the days of classical music, more ready to attack his task with blind fury than to wait for the establishment of scientific methods and refined standards of taste. He will snatch these with an eager grasp, and he will look out for them. But he will not wait for them. When Burney made his tours in Germany and the Netherlands, his aristocratic English ears were sorely distressed at the evidences which assaulted them with proofs that German musical life, unlike English, was not confined almost exclusively to eminent foreign masters whose every note was a lesson in the inimitable. He found that students of every instrument of the orchestra often had to do all their practising at the same hour in the same room, with the single concession that the trumpeters were requested to practise on the staircase. This was one item of his experience of German methods; his experience of the finished results is fairly typified by the fact that it was pointed out to him that no reasonable Saxon would expect the wind-instruments to remain in tune with the orchestra throughout a concert. All this is but the seamy side of eighteenth-century music in a country which regards music as a necessity, and not as a fashion. The average native musician in such a country will very probably be inferior to the average musician of a country in which musicians are the rare fruits of special impulse and talent. On the other hand, eminence will not be so likely to starve, and strange phenomena in specialised skill may find scope. Whatever the tolerance Saxon audiences may have shown for out-of-tune wind, they must have been accustomed to trumpeters who, though they had to practise on the staircase, could give an intelligible account of Bach's trumpet-parts which have only recently been reconquered by the finest virtuosos on specially-constructed instruments. With such vicissitudes in their daily musical diet, even the most aristocratic criticism and taste will have opportunities of basing themselves on a nobler and wider experience than that of opulent

connoisseurship. And herein, far more than in the spirit of German thoroughness and system, we may see the advantages possessed by German musical scholarship at its best. It has had every opportunity of being scholarship in a living language and in a practical art. We shall, however, find instances in the famous "Mannheim School," whose systematic study of *nuances* in performance had so much influence on Mozart, and still more in the recent work of the Leipzig Conservatoire, where the weaknesses of the German imagination undeniably show themselves. And, paradoxical as my view may appear, I cannot feel inclined to regard the scholarly side of German musical culture as one of its strong points. It covers with great efficiency a vast and novel field, but although most of the pioneer work in musical scholarship has undoubtedly been German—although, indeed, we should have had hardly any trustworthy editions of musical classics at all (German or Italian), but for German piety and industry—it is permissible to say that the German musical scholar has latterly tended to part company with the experienced artist to an extent which imperils the very accuracy he seeks to attain. This, again, only bears out the drift of our argument that the strength of German music lies not in its method and thoroughness, but in its practical *savoir vivre*. Where it over-specialises it becomes unmusical, and the great stream of German musical life passes it by.

The attempt to distinguish the music of Germany from that of all other nations can lead, after all, to only one definite conclusion as to the nature of its pre-eminence. The record of German musical classics is, above the record of almost any art, the achievement of works of art as perfect wholes. The great German composer's mastery of form is not the mastery which creates a mould which shall conveniently hold a given quantity of musical material; it is a mastery akin to that by which life itself shapes from within the bodies which it inhabits. This is the distinguishing mark of the highest art; and no more ambitious

subject could be propounded for an essay on artistic matters. It was true of Italian music in the time of Palestrina; it was true of the best Flemish music in the time of Josquin; and it was true of such Englishmen as Tallis and Byrd. But of no nation has it been true throughout such an immense range of artistic experience as it has been in German music. In at least three phases of art as important and as distinct as, let us say, Greek drama, Shakespearean drama, and the modern novel, the classics of music have been almost exclusively the German classics. Matthew Arnold once suggested that people who found themselves carried away by enthusiasm for the smaller forms of poetry, or for archaic or other by-products, should keep in their minds a few supremely beautiful lines such as can only occur in poems of cosmic range, and should use these as "touchstones." Now it is possible, or even probable, that the best musical culture for as much as the last two hundred and fifty years, especially in Protestant countries, is seriously deficient in knowledge of what should lie at the root of all our musical experience, the art of Palestrina. It is quite certain that the musician does not live (unless he be some Roman Catholic choir-master who knows little else) who knows a Mass, or even a motet of Palestrina by heart. This does not imply a grave confession of ignorance; there are plenty of musicians and amateurs who can recognise certain works of Palestrina when they hear or see them, and whose enjoyment of them is unaffected and perfectly intelligent; but the fact is that our memories are not trained to follow the lines of sixteenth-century art-forms, and accordingly there is no reason why a man who can conduct a Wagner opera by heart should find himself able to remember ten bars of the *Missa Papæ Marcelli*, even though he be an enthusiastic student of sixteenth-century music. To this extent, then, we are in the position of Greekless Romans: our musical memory begins with Bach, and the great musical civilisation that ended a century before him we only know by hearsay. Great though this

reservation may be, it does not minimise the impressive fact that if we try a musical application of Matthew Arnold's prophylactic against narrow enthusiasms for small provinces of art, we shall find all our " touchstones " to be German. No musician could suggest any others without showing an already specialised taste—which, no doubt, a vast number of modern musicians would be extremely anxious to do. But this anxiety was just what Matthew Arnold had in mind when he suggested a rough, practical antidote based on normal experience of the classics.

If German composers have created all the " touchstones " a musical Matthew Arnold could carry in his mind, it follows that a supreme sense of pure beauty is one of the special gifts of German music. This does not at first sight appear to be consistent with what is popularly known of other German talents, in the exercise of which physical beauty seldom receives the first consideration, or, if it does, often fails to aspire beyond prettiness. The paradox in German musical beauty results mainly from our habit of relegating the sixteenth century to the limbo of archaism. We must first realise that there is nothing archaic in Palestrina, and that his treatment of the ecclesiastical modes is no more to be understood as a crude attempt to attain the self-evident truths of the classical key-system than Plato's philosophy is to be understood as an adumbration of Herbert Spencer's. We shall then find that in the sixteenth century the home of physical beauty in music was where popular belief expects to find it in other arts—in Italy. In Germany it had to wait until the art had become incomparably more complex before its claims could be recognised. Then Germany recognised them as perhaps they have never been more perfectly recognised in any art; but by that time the Italians had given up the real problems of euphony as manifested in every fibre of the musical structure, contenting themselves with cultivating it on the surface, until in the nineteenth century Italian music reached a state in which no instrumental accompaniment was too coarse to

serve as a background to the roulades and vibratos of a solo singer, or too loud to pass muster as a "support" to the voice so long as the higher instruments trumpeted the melody, and thus gave the singer credit for all the noise they made.

So far, then, we are prepared to find in the history of German music evidences of a willingness to learn which is radically distinct from, or even opposed to a readiness to follow the fashions; a remarkable talent for improvising in all its forms (this, by the way, will strike everyone who has had any experience of German hospitality with its winning zest and resource in the designing of entertainments and the making of speeches); a firm grasp of the realities of art-problems, with an unshakable determination that none of them shall be sacrificed to the others, but that the work shall bear scrutiny from every aspect; and, perhaps as the reward of the faithful exercise of these noble gifts, the attainment of a beauty as cogent and all-pervading as has ever been realised by the human mind.

It now remains to illustrate these points in the music of each century. I shall not attempt to mention any but the great masters, except in so far as lesser masters have influenced them in a way that can be readily shown. Music exists in performance, and music that is not performed is accessible only to musicians who have cultivated their imagination assiduously in the reading of scores. When such musicians regret the neglect of certain composers, they mean that to perform their works would be a valuable service to musical culture in the world at large; and where that service has not been rendered, musical culture in general cannot be said to possess the works.

II

The earliest great name in the history of German music as an independent art is that of Heinrich Isaac, who flourished in the later decades of the fifteenth century. No

doubt much that is interesting can be said about Minnesingers and Meistersingers long before his time, but, like all that can be said about music before choral polyphony became a mastered language of art, it belongs more profitably to the history of poetry than to any but the most severely antiquarian technicalities of musical embryology. With Isaac, however, we have unmistakably to do with a great composer, almost certainly as great a master as his Netherlandish contemporary, Obrecht, though I have not hitherto met with any of his work that seems to show the genius of Josquin Després, whom we have every reason to regard as the Giotto of musical art. But Isaac's *Choralis Constantinus* is undoubtedly one of the greatest monuments of early polyphony, comprising, as it does, a complete repertoire of liturgical music for the whole year. It has been recently published in score, too late for mention in Grove's *Dictionary of Music and Musicians*. Isaac's name is kept familiar to us at the present day by the fact that, like his contemporary, Heinrich Finck, he produced many of the earliest harmonised settings of those famous songs which, whether devout or secular, so early justified, by their grave sweetness and strength, their whole-hearted adoption as the " chorales " of the Lutheran Church. Where no earlier setting of a " chorale "[1] is to be found than Isaac's it is natural to make the extremely unsafe assumption that he invented the melody; and no doubt he was perfectly capable of doing so if it was necessary for him to take the trouble. We have no reason to suppose that his genius was in any way inferior to the *genius loci* which originated such melodies. But, as a musician whose imagination was fired with the glorious and mysterious possibilities of the art of counterpoint, he found his plain duty and pleasure in taking the course of Flemish contemporaries, who were the musical overlords of Europe; and neither in Germany nor elsewhere would the art of music have been learnt so quickly

[1] I have no scruple in using the final *e* in this word to indicate its foreign accentuation, and to distinguish it from the English adjective "choral."

and so perfectly if northern musicians had been too ready to anticipate the Italians' and the Spaniards' pertinacious questionings as to whether all forms of Flemish ingenuity were really beautiful. Musical histories and dictionaries are full of enthusiastic accounts of such ancient masters as Isaac, and the enthusiasm, where it is the accompaniment of original research, may be sympathetic and genuine; but some warning is necessary against the false impressions which arise when the enthusiasm passes from researchers to compilers, or even when the musicians who can read scores with a conductor's or composer's realisation of the musical effect delegate the task of research to experts who can only tell the date of a manuscript by the water-mark in the paper. A mere musician may be excused if he is now and then tempted to indulge in gibes at the musical culture which invites him to subscribe to critical editions of enormous complete volumes of Isaac and Obrecht while the wonderful versatility and poetic beauty of Josquin still remain accessible only in casual examples scattered through divers more or less untrustworthy anthologies. This is an oft-recurring phenomenon of musical scholarship; the scholar who has the knowledge and patience which might avail to restore authenticity to the text of a masterpiece has too often the temperament that prefers to be absorbed in side-issues.

The mention of Isaac's part in the history of the German chorale brings us to the very centre of German music. It is all the more necessary that we should understand clearly what is and what is not peculiar to Germany in this institution of the chorale. Luther himself was a good musician; he learnt his music where he learnt his theology, and only as a "turbulent priest" of the Roman Catholic Church could he bring about the Protestant Reformation. There was nothing peculiarly Protestant in his accepting secular melodies as hymn-tunes; both that procedure and its justification "that there was no reason why the devil should take all the best tunes," would have met with the thorough

approval of Animuccia, who seems to have done something of the same kind in the *Laudi Spirituali* which he produced in the oratory of his friend, St. Filippo Neri. Yet musical history prefers to regard Animuccia as one of the pioneers of the oratorio as an art-form, rather than to recognise him as representing in Rome itself an effort, not altogether unlike that shown by the psalm-books of Geneva, to produce a religious music that could be "understanded of the people." We must make allowance for the instinct which leads us to assume that because the Italian language has been a foreign fashion in musical England and Germany, it has been so in Italy too.

But if it is our duty to minimise the originality of the German chorale as an art-form, it is all the more impossible to exaggerate its distinction as an expression of the German spirit. The defiant words of "Ein' feste Burg" can tell us plainly of Luther's fire and strength; but his tune gives more than his word for it that the fire and strength are divine. No one could sing the poem and remain a Roman Catholic; no one could sing the tune and fight in an ignoble spirit. In as far as German music fought on the side of the Reformation, it fought with tremendous power, and the encouragement of congregational singing armed the laity with Luther's mightiest weapons. Luther's tunes and the Austrian national anthem are perhaps of all music that has ever inspired the populace in a national crisis, the only melodies that can add an intrinsic musical dignity to the force of their historic associations. The *Marseillaise* begins well, but Schumann found himself compelled to strengthen and simplify it before he could use it as the climax of *Die beiden Grenadiere*. But the composer who desires to decorate his own music with an allusion to "Ein' feste Burg" must wear a giant's robe. Wagner knew this, and in the *Kaisermarsch* alluded to but two lines of the tune, with just the noble reticence that an ancient Greek artist would show for things divine. Mendelssohn in his *Reformation Symphony* was more ambitious, but he confessed that he failed here,

and he never allowed the work to be published, and would probably have destroyed it if he had thought it would appear posthumously. Meyerbeer was quite unconscious of any difficulty in handling the tune. It was, and is, one of the great attractions of *Les Huguenots*, and its brilliant treatment in double-quick march at the end of the overture is, to the best of my belief, the filthiest blasphemy in all music. Putting aside all questions as to the worthiness of the composer, there was only one period in which the tune could be treated in an elaborate work the form and purpose of which was both worthy of it and relevant; and that period was not Luther's own, but John Sebastian Bach's. Bach's own cantata on "Ein' feste Burg" is one of his greater works and is in every respect worthy of the tune; but it is quite likely that his contemporaries had succeeded in treating the tune in a musical language that was not offensive in relation to it, though they certainly never produced a work comparable to Bach's. This is noteworthy as showing the way in which musical developments arise at periods utterly remote from those periods in the world at large to which they seem most akin. The great music which shall vibrate in ideal sympathy with the spirit of the Reformation does not arise until Voltaire is at the court of Frederick the Great.

The natural tendency to think of Germany as the country of Luther must not blind us to the fact that, while the music of the Reformation was still limited to a branch of folk-song, the Roman Catholic Church possessed the devotion of the greatest German masters of pure polyphony. Their names are unfamiliar to modern concert-goers, and the occasional discovery and exploitation by madrigal societies of some exquisite strophic song by Eccard (1553–1611) or Michael Prætorius (1571–1621) will not perhaps avail to bring this or that otherwise forgotten name, whether Roman or Lutheran, within the scope of this essay, whatever their actual historical and artistic importance. But there can be no doubt that we must mention those

sixteenth-century German masters whose works are to this day cultivated in the repertoires of Roman Catholic choirs; all the more because musical history has been inclined to ignore them. Moreover, there is no opportunity of finding clues to the special qualities and range of the German musical genius so favourable as that furnished by a period in which German music was evidently both masterly and self-confident, but at the same time decidedly incapable of either attaining the standard set by Rome or of imposing its own standard upon the world. With the time of Bach and Handel, German music, as first represented by these two great names, becomes classical music *par excellence*, not in the estimation of the eighteenth century, but in the modern musical memory; and it is perhaps neither possible nor desirable that our normal ideas of what is classical in music should not be essentially German. But this may easily mislead us into assuming that what is essentially German in music is necessarily normal. And there are stages, early and late, in musical history where this is not true. In sixteenth-century music, if we wish to profit by Matthew Arnold's advice to poetic enthusiasts, we must look to Palestrina, Victoria, Marenzio, to Rome and Spain for our "touchstones." The task of criticism is here very difficult and delicate; those who best know the vast territory to be explored have either the impulse of explorers or (to put the matter frankly) the horizon of Roman Catholic choir-masters. The explorers, after a long day's journey through an unknown country, will sometimes fail to recognise a familiar landmark if it meets their sight at an unaccustomed angle; thus, the editor of Hans Leo Hasler's works finds in his *Missa Come fuggir* peculiarities of phrasing which seem to him quite unprecedented in the classics of the sixteenth century. But this mass turns out to be based on a madrigal *Come fuggir* by that most famous and perfect of madrigalists, Luca Marenzio; the whole hypothesis of a sixteenth-century mass with a title (whether secular or sacred) is that it takes

its title from the source of its themes; whatever peculiarities there may be in Hasler's mass must inevitably show themselves in Marenzio's madrigal; yet *Come fuggir* is not only a perfectly normal specimen of his style, but is accessible in more than one popular anthology. We may fairly conclude from this that if we absorb ourselves in the German schools of sixteenth-century choral writing, it is possible that the purest classical style of Italy may become strange to us. Of course, a patriotic German might argue that the musical supremacy of Italy at that period was a superstition; and, indeed, there always will be a strong, and far from contemptible instinct to assert the claims of a "provincial" art to possess more "individuality" than the classics "of the centre." This is actually true enough so long as we have only schoolmen to deal with. In the sixteenth century a weak effort of Aichinger's is as surely worth more than a stock masterpiece of Croce's as one of John Field's nocturnes is worth more than the Adagio of Spohr's Ninth Concerto. The trouble begins when we drag in Palestrina, or any other such master as can create the daylight in which the schoolmen work and shine. He who despises the light of common day will never have any but a hearsay knowledge of the light that never was on sea or land; nor will he recognise it in the daylight of Palestrina and Marenzio, though it is there.

But while it is impossible to put the German music of the sixteenth century on a level with the Italian, or even with the achievements of our own great masters Tallis and Byrd, yet the best work of such masters as Hans Leo Hasler (1564–1612), Gregor Aichinger (1565–1628), and Handl, better known as Gallus (1550–1591), is of high importance both historically and æsthetically. Warned by the German scholar's misadventure with Hasler's mass on *Come fuggir*, the reader will accept my generalisations with caution, but I shall as far as possible confine them to arguments that explain themselves. In the first place, no accumulation of errors on points of musical scholarship could

invalidate the general conclusion of German experts that the two dominating influences in German choral music at the close of the sixteenth century are those of that greatest of Netherlanders, Orlando di Lasso (1530–1594), who settled in Bavaria, and of the Venetian school represented by the elder and younger Gabrieli. If the rather sentimental piety of Aichinger disinclined him to yield to the influence of Lasso (though they both came under the patronage of the Fuggers and of Duke Albrecht), it is none the less a sign of some strength of individuality that his music should succeed in avoiding all resemblance to that of so powerful and dominating a mind. If Aichinger had also succeeded in avoiding Venetian influences, it is hard to see on what basis he, as a German Roman Catholic occupied with elaborate liturgical art-forms, could have been a German composer. Hasler, a much greater master, with a far wider range of expression, is at this day well known to Roman Catholic choirs by his *Missa Dixit Maria*, written on his own motet of that title; the motet is very pretty, and the popularity of the mass is largely due to the fact that in it the prettiness of the motet is spun out to a thinness that brings the purest style of the sixteenth century into curious proximity with the sentimentality of nineteenth-century religious pictorial art of the *Biedermayerzeit*. It does not represent him at his best, though it is more German than his greater inspirations. Gallus (a Latin translation which conceals the German name of Handl, which in its turn conceals the Bohemian name of Petelin) is perhaps the most independent of the German choral composers of his time; if his work reminds us more often of Lasso than of the Venetian school, that is mainly because both he and Lasso are often eccentric and experimental. But Lasso's experiments, even at their worst, have some amusing whim behind them which is both literary and musical; while Gallus is capable of writing in sixteen real parts without a single idea in his head beyond the theoretic possibility of sixteen-part counterpoint. Yet theoretic possibilities some-

times stimulate him to produce unmistakably great music; and this is a frequent phenomenon, by no means confined to Germany, but often characteristic of periods of artistic transition, where rigid forms (such as those of canon) may give the composer the solace which the sonnet gave to Wordsworth when he "felt the weight of too much liberty."

Perhaps on the present occasion the risk of dogmatic assertion is preferable to the risk of dwelling disproportionately long on a period in which German music has admittedly not attained its majority. A mass of evidence which, though far from complete, is too large for discussion here, indicates that Lasso, the Venetian school, and the special genius of German music have certain elements in common which it is more important to recognise for what they are than to assign by right of priority to one master rather than another. Mr. Berenson, in one of his essays on Venetian schools of painting, has characterised the Venetian painters as being eminently "illustrators"; and they have always been supposed to take a special interest in colour for its own sake. We need not attach any solid value to the coincidence, but both these statements happen to be very luminous as applied to the Venetian school of sixteenth-century music. They also apply to Lasso and to his German contemporaries. Only in Lasso's case are they often manifested in works of the highest genius, wherein they become not only compatible with qualities more purely musical, but actually themselves give rise to the profoundest musical ideas. His German contemporaries show them too often as weaknesses, except where the conditions are specially favourable to musical effect. These favourable conditions are likely to arise when the composer deals with a chorus divided into a large number of parts. If you wish to find some motet of Hasler's that shall bear comparison with Palestrina, you may shorten your search by turning at once to the twelve-part compositions at the end of the volume. Only Palestrina, Marenzio, Victoria, and Lasso can rise to their greatest heights as often in four-part as in six-part music. This is

partly because they are still greater masters of musical colour than any composer can be while his mind is bent on colour for its own sake; their vision of normal colours is never dulled, and what is novel to jaded eyes is to their undazzled gaze one more thing which must await its turn for use when it is wanted.

We may find another clear sign that the German musical talent is, in its early stages, a talent for illustration, in the fact that in the sixteenth century the Germans were not at their best in the composition of the mass. Neither, for that matter, was Lasso, though his masses fill eight volumes. A text that must be set by all composers and sung every Sunday and holy day in the year; a subject that must be painted as altarpieces for every church in Christendom: these are things which damp the inspiration of the illustrator, while they give freedom to the "absolute" artist who feels his art to lie in things that cannot be translated or described. This seems a strange conclusion concerning the early masters of the nation that has not only made of "absolute music" perhaps most powerful and perfect art the world has yet seen, but has been the only nation to achieve any large body of "absolute" music that can claim to be powerful or perfect at all. But when we come to reckon up what materials are necessary to the creation of even so closely limited a form of "absolute music" as one of Bach's Forty-eight Preludes and Fugues, the paradox will cease to puzzle us. The "absolutism" of German classical music is like the happiness of Aristotelian ethics; it presupposes "adequate external resources," and it will not betake itself to the mountain fastnesses of the contemplative life as if the rest of human life was a thing to be despised. Neither, for that matter, did the great musical saints of Italy and Spain so shun the world; they were no ascetics, but artists whose native talent found the resources of pure vocal polyphony inexhaustible, and all other musical resources infantile and squalid. The native German talent is not eminently vocal, and this, at the outset, put Germany

at a disadvantage compared with Italy. But it is not in the German nature to be content with the limitations of its native talent; no doubt, herein the German often shows less taste than the Frenchman or Italian; but it is here also that the quick, impatient intelligence of the Latin artist often destroys his prospects.

III

When the resources of Palestrina were exhausted, nothing could be more spirited and adroit than the revolution effected by the Monodists, the first pioneers of opera, whose work was so brilliantly carried farther by the mastery of Monteverde (1567–1643). The first Monodists were content to achieve their revolution with very little musical talent and no artistic resources that time could preserve; the only elements of their art that seem to them relevant or interesting were the new elements. Perhaps it is too dogmatic to assert that no German could have so parted with his musical birthright as Caccini and Peri; but we know of no German who did, and nothing in German music of any period would lead us to believe that a German composer who had so little musical talent as Peri would have either the effrontery to attempt a new departure or the discretion to evade comparison with older masters. The Italian monodic revolution had no definite parallel in Germany, but it had an immediate and profound influence on German music, and its results therein were significantly different from its results in Italy. To the Italians the issues seemed plain from the outset; the new art, so long as it remained new, was either everything or nothing; the artist must choose between the new way and the old, or else show himself to be a confused and characterless eclectic. In such a clear, logical atmosphere progress in pioneer work is rapid, but very little art is produced that has permanent value. A disproportionate *onus* is thrown on the personality of the artist, whether

he be the author or the performer of pioneer works; and the artist who still cultivates his classics is driven to adopt an ascetic and reactionary attitude even if it be foreign to his temperament. And no art stiffens into conventionality more rapidly and firmly than the most revolutionary art; partly because of the tendency of all revolutionaries to rely more on *a priori* logic than on experience, and partly for the contrary reason that the revolutionary art owes so much of its initial success to the personality of its inaugurators that, when that personality is no longer present, "tradition" reigns in its stead, and, when the conflicting traditions have cancelled each other out, hagiology arranges and supplements the whole until the record is immutable and complete. It is astonishing how quickly dramatic music advanced in Italy from the time of Monteverde to that of Alessandro Scarlatti; but nothing in the history of art is more notorious than the stagnant tyranny of Italian opera throughout Europe from the time of Alessandro Scarlatti to that of Gluck's reforms. Like all notorious histories, the facts are less crude than the reformers' accounts of them, and there is some significance in the non-appearance of any definite musical revolutionary among German composers before Gluck himself. Returning to the beginning of the seventeenth century, we may find in Heinrich Schütz (1585–1672) a splendid example of the qualities which in the next century were to raise Germany to a height in music such as has been attained in no other intellectual province since the days of ancient Greece.

Schütz's prefaces to the volumes of his works published in his lifetime show him to be far from inarticulate apart from his music; he could evidently have held his own in a contest with the Italian theorists who contributed so many effective pamphlets for and against Monteverde and his tendencies. At least once he mentions Monteverde by name as "mein scharfsinniger Freund;" he adapts one of Monteverde's monodic cantatas to a sacred text; and he also puts a translation of one of the purest of his

master Gabrieli's Latin motets into one of his own German volumes, by way of acknowledging his schooling. Everywhere he shows the keenest interest in the point of what his contemporaries and predecessors did; but nowhere does he betray any inclination to decide between one tendency and another. He does not seem to see any necessity for a decision. And yet his is no weak eclecticism; nor does he often miss the point of any device that he adopts, whether foreign or native. He is a great enough contrapuntist to have moved with ease among the restrictions of the purest sixteenth-century style; and he uses his contrapuntal mastery regardless or unconscious of the prejudice it must arouse among his revolutionary colleagues in Italy. It would be interesting to know what his "keen-witted friend" Monteverde really thought of his style. Probably Schütz seemed to the Italian monodists to be an ingenious but puzzle-headed barbarian, if ever he attracted their attention at all. One way in which Italian polyphony of the old school showed its decadence, in its last struggles for existence, was by piling up vast masses of stagnant harmony for multitudes of antiphonal choirs. Schütz erected many such Gothic piles, but they would not be very acceptable to the Italian reactionaries, for they are as modern in their "licences" as the most emotional monody. Not that the reactionaries could not make the best of both worlds; was not the saintly Pitoni so great a master of contrapuntal abstraction of mind that when he composed a forty-eight-part mass for twelve choirs he wrote first the twelve basses, then the tenors, altos, and sopranos, part by part separately without ever making a score; and did not this same Pitoni produce an astonishing effect by introducing short chromatic trios into the *Dies Iræ* of his *Missa pro Defunctis*?

Archaic as most of Schütz's work seems to us, and rarely as he produces a coherent musical scheme, he is a composer who conclusively proves that it was in Germany, and not in Italy, that the questions raised by the monodists

were to be answered without false simplifications. Music, whether "progressive" or reactionary, was already becoming too easy for the Italian talent; it no longer absorbed the whole capacity of men of character so simple and great as Palestrina. Nine-tenths of the discussion which raged round Monteverde and his older and younger colleagues was literary; and to this day few musical historians attempt to sift the obscure and difficult musical facts from their brilliant dramatic and rhetorical accessories. Already Germany seems to be much more the home of "absolute music" than Italy; at all events, it is impossible to describe any work by Schütz without entering into details far more purely musical than we find to discuss in the works of Monteverde. Yet Schütz is no "absolute musician" in the sense of a composer who is independent of the text his singers are to deliver; he is as minute and irrepressible an illustrator as the most luxurious Venetian, and it is impossible to tell whether he could have proved the purity of his musical nature by setting a text of universal application. As a Protestant, he never wrote a Mass, and the Reformation was so recent that there was dramatic emotion in the mere use of the German language for religious music.

But this did not prevent music from attaining its own integrity in the hands of men like Schütz. Few classical artists have worried about the "legitimacy" of letting their art illustrate something external to itself. A complete work of art is incomparably more complex than any one method of logical analysis or technique; it is the outcome of an experience far more comprehensive than its ostensible contents; and the slowest and most self-conscious of composers attains his final result by methods of trial and error which have, no doubt, been greatly shortened by technical training, but which have no more direct connection with that training than any other form of presence of mind in emergencies. It is a matter of complete indifference to a mature work of art whether the theory on which it is based recognises the integrity of the art or not, so long

as the theory has not prevented the artist from using his whole resources. His mind ought to be like a saturated solution of something that will crystallise round any foreign body that is dropped into it at the right moment. The crystals will reject everything in the solution that is irrelevant, and it is the foreign body that helps them to do so by inciting them to form. When they have formed it can be removed, or perhaps even dissolved, if it has been of such a shape that what is once built round it is in stable equilibrium. An alphabetical acrostic is a perfectly satisfactory form for Hebrew poetry; it completely vanishes in translation, and Palestrina, following the uses of his liturgy, derives from it a far more mysterious but equally harmless irrelevant stimulus to his art by making highly ornamental settings of the names of the Hebrew letters at the beginning of each verse of the Lamentations. Here, then, we have music that becomes "absolute" because some of its words have become merely magical. German music becomes purely musical in the way in which Palestrina's general ideals of church music are purely musical; and this is a way which may truthfully be said to have passed away from Italian music (with the rarest exceptions) since Palestrina's time.

Let us illustrate this in detail by an example where Schütz, adapting approved Italian monodic methods to German conditions, fails, and produces a comic effect such as the enemies of Monteverde could never have caricatured, because Monteverde never suggested anything of the kind. There was in many German towns a picturesque custom, on occasional holy days, of playing music for trombones on the tops of church towers, with or without singing. Inspired by this *Thurm-musik*, Schütz writes two pieces for a bass voice accompanied by four trombones and an organ. The organ and the choice of a single deep bass voice show that these pieces are not themselves *Thurm-musik;* but the horrible suggestion that the first two trombones may be replaced by violins an octave higher shows that Schütz

was too familiar with the trombone-quartet as a customary form of open-air music to have any sense that it ought to be specially dignified. The text of the second of these pieces is exactly the sort of proclamation that should be delivered from a church tower, and this makes the complete failure of the piece all the more significant. First there is a long introduction for the trombones and organ, beginning grandly, but soon becoming much too athletic for the dignity of the trombones. They can play it fairly easily, but that does not prevent us from wishing it were impossible. However, after a minute or two of this ecclesiastical clog-dance they double-shuffle their way to a decorous full close; and then the bass voice, accompanied by the organ, declaims, "*Attendite, populc meus, legem meam; inclinate aurem vestram in verba oris mei. Aperiam in parabolis os meum, loquar propositiones ab initio.*" This takes some time, as the words are often repeated. Then follows another symphony for the trombones, beginning very finely, but losing dignity almost in the same way as the first symphony. When this is over, the voice has a duet with the first trombone, accompanied by the organ. The text is merely:

> "*Quanta audivimus et cognovimus ea et patres nostri narraverunt nobis.*"

but this movement is longer than the other vocal movement, and it concludes the work.

Now let us see what points Schütz makes in this not very suggestive or complete utterance. His treatment of "*Attendite, popule meus,*" is a series of full closes in which the singer, being a bass, sings the bare bass of the harmony as if it was a thing of great intrinsic musical interest. So it was—to Schütz; the rise of monodic singing and of instrumental accompaniment had just awakened the musical world to the fact that the bass of a mass of harmony really had a specially "fundamental" character that made it in many respects the opposite of "melody," in whatever

other part melody was to be found. And at such a time the more purely musical a composer's disposition, the greater would be his temptation to think that there was some special merit and interest in a bass that had obviously never been intended by nature for a melody. Here, then, the German composer might have been better guided by a Latin sense of beauty; but that quality had already deserted the Italians themselves, or rather, they had at that juncture little use for it. But they had a pertinacious interest in dramatic expression, and this might have led Schütz to inquire whether these bare basses really meant anything at all. To the artist the danger in such inquiries is often much the same as the danger to science in insisting upon knowing the practical use of every line of thought. The "speaking bass" might never have become the tremendous rhetorical force Bach, Beethoven, and Wagner made of it if German composers had had the tasteful common sense to strangle it for talking nonsense in the time of Schütz.

Schütz's next point is the merely habitual choice of a declining figure for the word "*inclinate,*" a piece of illustrative penmanship which modern criticism derides, but which any composer earlier than the nineteenth century would have found more troublesome to avoid than to make musically natural. Here again we have one of the many ways in which a habit, irrational in itself perhaps as well as in its application, may be a help rather than a hindrance to an artist's invention. This little figure does Schütz's music no harm. He is less fortunate when "*in verba oris mei*" suggests to him the desirability of a long flourish on "*oris.*" In spite of modern English and Teutonic prejudices, it is not true that vocal *coloratur* is devoid of intrinsic expression. It is not a natural feature in declamation, but it is one of the first things which distinguishes song from speech; and if singing is comparatively unnatural to northern races, it is natural enough to southern, and so the Italian composer has always recognised *coloratur* as an expression of those emotions that prefer singing to

speaking. Schütz's flourish on "*oris*" is wrong, partly because the text is unemotional, and partly because Schütz tries to make his flourish original. And it so happens that the flourish he produces is exactly the same as one that Orlando di Lasso used some sixty years earlier to illustrate a drunken peasant rolling about to the words, "Soll der Bauer nicht voll sein?" As a coincidence, this is of no importance whatever; such "reminiscences" are most readily detected and discussed by critics to whom music most completely fails to convey any coherent or accurate impression. The point that ruins Schütz's flourish has nothing to do with the question of whether he knew Lasso's song—it is simply this, that as an illustration of Lasso's meaning it is so admirable that for a singer to give it any other expression is a sheer physical impossibility. If we do not know Lasso's song, Schütz's flourish is vaguely grotesque, and that is the best we can make of it. Later on, the word "*narrabo*" makes the singer naïvely garrulous. That is a pity; but it also makes the first trombone garrulous, and that is a scandal. It is impossible to conceive that an Italian composer would ever produce anything so uncouth in all its gestures and habits. In the lowest degradation of nineteenth-century Italian opera, where the orchestra is more brutal than the steam-band of a merry-go-round, and where the coarsest dance-rhythms are a support for brilliant *coloratur*-singing in the most gruesome death-agonies, there always remains a strangely august sense of one abiding truth which no Italian can forget, and which may be described as truth of gesture. Italian music has never lost the superb gesture; and the superb gesture can never be wholly laughable, even when it is all that an art has left. For want of it Schütz cannot set a dignified *Fest-und-Gedenkspruch* such as Brahms achieved some two hundred and fifty years later, though Schütz uses a most picturesque combination of instruments, while Brahms falls back on the vocal resources of Schütz's Venetian master.

Now let us look at Schütz's other piece for the same combination. It shows exactly the same external features; there is the same squalid suggestion that two of the trombones may be replaced by violins; there is the same alternation of two symphonies for the trombones, and two sections for the voice and organ, with the trombones taking part towards the end. But so long as we reject the idea of violins, there is nothing uncouth or grotesque in the work from beginning to end. It is David's lamentation for Absalom; and the text is simply this:

"*Fili mi, Absalon*";

and, after the second symphony (which, though agitated in rhythm, is admirably suited to the dignity of the instruments:)

"*Quis mihi tribuat, ut ego moriar pro te! Absalon, fili mi, Absalon!*"

There is no *coloratur*, and the voice rarely sings a bass that is merely fundamental; but in all other respects the technique is indistinguishable from that of the other piece. Yet the pathos and beauty of the whole is nothing short of sublime, nor has it any parallel in Italian music since Palestrina's *Paucitas dierum*. Now we must note two things about the text of this piece. Firstly, it is undeniably dramatic, in a way in which the text of Palestrina's *Paucitas dierum* is not. *Paucitas dierum* comes, indeed, from a dramatic book of the Bible, being part of Job's complaint; but, as an extract from a much longer speech, it has no quality that marks a definite moment in an action or event. But Schütz's text is David's lament exactly as it is given most dramatically in the Biblical account of how he received the news of Absalom's death; its only rhetoric is its perfect realism; the chronicler even hints that the words were repeated again and again much as Schütz repeats them, and as he would have repeated them for merely musical reasons even if he had no dramatic feeling at all. Secondly,

whatever music can accomplish for such a text will not be accomplished by superb gestures. With all its realism, the text is of a kind that gives music perfect freedom; it demands no more dramatic movement than an Amen chorus. But its intense emotion demands and triumphantly obtains from the German composer a quality essential to the highest art, a quality often present in German musicians whose mastery falls short of the highest—a quality, indeed, so characteristically German that the best words for it are but awkwardly translatable into any other language. *Innerlichkeit* is the more matter-of-fact word. Schütz's *Lamentatio Davidi* shows the "inwardness" of German music, with its power of revealing the soul where gesture can only conceal the face. *Innigkeit* is the untranslatable word; the great German music covers an immense range of emotion and thought, but alike in Haydn's irrepressible humour, in the mysterious profundity of Beethoven's last quartets, in the carpet-slippered intimacy of Schumann's pianoforte music, and in the devouring passion of Wagner's *Tristan und Isolde*, the art is *innig* throughout every fibre, as it is in the saintly music of Palestrina. The famous nineteenth-century discovery of the contrast between the "classical" and the "romantic" becomes utterly irrelevant where this deepest of human qualities appears. So also does every question as to the actual limits of thought or emotion in any given work, or even in the life's work of any one artist. It is idle to minimise the greatness of Mozart by doubting his capacity to express tragic passion; no competent critic will confuse beauty with prettiness in Mozart's *Figaro* any more than in the Hermes of Praxiteles. Again, where the art is *innig* we need never trouble to ask if it is "absolute." *Innigkeit* sets the spirit of music free, whether the music has to adapt its forms to externals or not: The musical forms of *Figaro* are not as rich and complex in themselves as those of Mozart's string quartets, concertos, and symphonies; but they are quite as perfect in themselves, and what they might seem to lack in com-

plexity is supplied by their intimate union with a dramatic text which they so transfigure that a bowdlerised Beaumarchais becomes something like a Shakespeare in Mozart's hands.

But the German composer's *Innigkeit* was not alone sufficient to make music a perfect classical art; nor was the Italian's aristocratic instinct for gesture a superfluous quality or a sure sign of insincerity. From the time of Schütz onwards till the youth of Beethoven—*i.e.* from 1600 to 1800—Germany continued to learn its musical language and etiquette from Italy: and it is not too much to say that from the time Germany ceased to do so, pseudo-classicism, which appears at all times as a practical necessity, first began to be a real menace to music.

IV

The long life of Heinrich Schütz very nearly bridges over the century which yawns between the death of Palestrina and the birth of Bach; for Schütz lived to be eighty-seven, and Bach and Handel were born in 1685, exactly a century after him. In dwelling so long upon Schütz we do no great injustice to German music of the seventeenth century; but it was not from him and his unworldly tribe that music could learn a universal language. Bach's music seems to us typically German; indeed his choral works, which vastly outnumber his instrumental music, proved quite impracticable even in his own country when he was no longer alive to conduct their performance; and, a century after his death, much of the finest characteristics of his style seemed merely provincial to the very musicians who rediscovered him. Yet, as has been already remarked, all his art-forms are Italian and French, except those that consist of the polyphonic treatment of German chorales. And we have seen that the polyphonic treatment of German chorales is exactly the same as the treatment of Gregorian melodies by the Flemish, Roman, and Spanish

masters of the sixteenth century: indeed the German word *Choral-gesang* itself does not recognise any distinction between Lutheran or popular and Roman or ecclesiastical. Not even Bach's Passions, any more than those of Schütz, derive their design from sources which cannot be ultimately traced to the Roman Offices for Holy Week. Two other elements in Bach's art appear to be of French origin; these are the French overture and the dance forms of the suite. But, after all, Lulli, the classical organiser of the French opera and ballet, was an Italian, and there is nothing in his French overtures which may not be found in the art-forms of his contemporaries, Alessandro Scarlatti and Corelli. In the last resort, Bach's art rests on the foundations established in Italy by a century of untiring experiment and codification culminating in the Neapolitan school under the leadership of Alessandro Scarlatti (1659–1725). It would be a mistake to claim for Alessandro Scarlatti that he produced any supremely great works of art. The irresponsible *genre*-pieces of his son Domenico retain far more vitality at the present day. But it is quite impossible to exaggerate Alessandro's importance in musical history. There is no lack of sobriety in calling him the chief organiser of the language of classical music as it subsisted from the end of the seventeenth to the beginning of the nineteenth century. In only one direction have Bach and Handel a technical power, the full development of which they cannot be said to owe to the standards set by Alessandro Scarlatti; and that is a direction which, from their time onwards, appears to be a specially German talent. It may be defined as a talent for composition from within, or as the effect of German *Innerlichkeit* upon the whole nature and growth of musical form. Before the time of Bach and Handel the talent for composition in music—composition in the universal sense in which we apply it to prose or to painting, was a gift which rarely deserted the Italians except in the earliest efforts of the monodic school. Long-windedness was a Flemish vice. Patchiness and shortness of breath

were failings common to England, France, and Germany. Perfect ease of movement was an Italian characteristic shared only by Spain, where it was apt to slacken into indolence. But throughout the seventeenth century there are signs in German music of a new quality of movement which, long before it attains ease, shows itself as power. And when the struggles of the seventeenth century were accomplished, and music came to maturity in the work of Bach and Handel, this power of movement became, once for all, the most subtle and compelling quality in classical music; and though only the five or six greatest composers of all time have possessed the whole secret of this power, yet their example has compelled all musicians, from the time of Bach to that of Wagner, to regard any evident weakness of movement as a fatal defect in a composition. This standard of power is set entirely by Germany; yet there is little or no trace, either in musical history or in methods of teaching, that Germany or other nations were conscious of its existence while it was being maintained. In the time of Palestrina, power of movement was precisely what Germany lacked, and a thorough familiarity with the whole range of sixteenth-century musical thought is necessary before we can appreciate the fact that Palestrina's and Victoria's unfailing mastery of movement is positive power, and not mere ease. But the movement of later Italian masters—the movement, indeed, of composers whom the greatest Germans themselves revered and studied as classics—no longer satisfies us as a quality of the highest art when Germany, in the eighteenth century, takes the leadership of music. It is no longer enough that the movement of a composition shall not be awkward or dragging. A Giottesque solidity has come into the musical perspective, and, once appreciated, it becomes a *sine qua non* even to artists who can get no nearer to it than a mechanical knack will bring them.

The art-forms perfected in Italy by the beginning of the eighteenth century gave an almost infallible security to the composer's listener's sense of movement and

coherence. The forms based on old polyphonic principles became easily controlled by the taste and tact which the more melodic forms of the aria, the sonata, and the concerto fostered; fugues and *ricerare* did not cease to be written, nor did they become corrupted by alien elements; but they did cease to be interminable, and, while avoiding the outward symmetry of the newer forms, they arranged their own resources more and more with a sense of unity and climax. There is no single code by which the fugue became a mature classical art-form: the rules given in technical treatises are based on the convenience of teachers and students, and any fugue by a great composer that complies with even a bare majority of them, has complied by pure accident. It is a literal fact that there is not one fugue in the whole works of Bach and Handel that can by any stretch of imagination be fitted to the scheme accepted by teachers on the authority of Cherubini. This is no very grave scandal, for the truth is that fugue is a texture rather than a form, and a teacher cannot reasonably expect a pupil to write fugues without laying down a form for them as well as rules for the texture. But it is rather scandalous that when Bach himself writes a work called *Die Kunst der Fuge*, consisting of a series of fugues, all on the same theme and arranged in a perfectly clear and logical classification, subsequent theorists should completely ignore his whole scheme and quote from the work only such isolated facts as may seem to support Cherubini's. *Die Kunst der Fuge* classifies fugues entirely by their degrees of complexity in texture; it pays no heed to the easy presumption that the rhetorical force of a contrapuntal device must vary directly as its technical ingenuity; and the "eight essential elements" of Cherubini's fugue appear one by one in the course of Bach's series, and, as he reaches the more complex fugues, in many combinations; but neither in this quasi-didactic work nor in the whole range of his art do we find him showing the slightest concern to bring the whole "eight essentials" into one fugue. It is not

necessary to deny that he ever happens to achieve this; among the many far more complex designs and combinations which he constantly carries out, it is fairly certain that all the eight essentials will come together. But long before this has been consummated, we may be sure that the technical complexity of the fugue-devices will be playing a very small part in the rhetoric of the whole, and the most complicated stretto is just as likely to occur quite early in the fugue as at the end, where the academic doctrine expects it to crown the edifice. In two directions the academic doctrines have falsified our view of music in the first half of the eighteenth century. They have blinded us to the freedom and variety of form in those compositions which, by single devotion to the principles of fugue-texture, have earned the title of fugue; and they have failed to give us any hint of the ubiquity of fugue-texture in many art-forms that are based on other principles. One result of this is that it becomes possible for serious writers on music to talk as if Bach's constant use of contrapuntal movement was a peculiar mannerism either of his style or of his epoch, and even to speak of his " obsession " thereby as a defect in his art. It will be time to treat such views with respect when classical scholars begin to treat the properties of quantitative verse as the private mannerism of a few ancient Greeks and Romans who could have done better if they had been large-minded enough to appreciate the superiority of stress and rhyme.

In spite of the imperturbable stability of the Italian aria and concerto as forms founded on melody and solo-singing or solo-playing, music was still a contrapuntal language on which other than contrapuntal forms of obtaining movement had so obviously disruptive an effect that they actually were used avowedly to that end. The rhapsodical beginnings and interludes of the toccata show this very clearly; the form owes its name to its realistic imitation of the behaviour of an organist or harpsichordist trying the touch of his instrument, be-

ginning with a capricious alternation of runs and sustained chords until he feels that he knows the instrument well enough to settle down to a fugue. Bach's toccatas are the first and last that settle down to fugues in which the swing and power are steady enough to satisfy the demands of the introduction and interludes; and the abruptness and grotesqueness of his introduction is proportionate to the triumph of his end. Another art-form opposed to counterpoint is that of recitative, the vocal formulas of which remained with surprisingly little alteration from the time of the early monodists to the early days of Wagner. In polyphonic instrumental music we often find features analogous to the dissolution of rhythm in recitative: the rhapsodic portions of the toccata give us the typical case, and the title *recitativo* is occasionally given by Bach to instrumental passages of that type, though he never uses the vocal formulas except for voices. Even in his vocal recitatives he has a set of formulas that are obviously not Italian, but German; they coincide with the Italian forms only in so far as the declamation of the German language encourages them to do so. It is interesting to see how in his own lifetime, his son, C. Philipp Emmanuel Bach, not only broke often into essentially vocal recitative in his sonatas, but always reverted to the purely Italian formulas.

Recitative and toccata-passages, however, presuppose by their very violence that the listener does not demand "relief from the steady grind of counterpoint," but that the steadiness of contrapuntal movement is peace, and the interruption of it something like war. The conception that textures unattractive and primitive in themselves may by mutual contrast fill a higher function in a great piece of music than either counterpoint or declamation—this conception could arise only through another musical revolution, less chaotic in immediate results, but in origin far more Philistine than that of the seventeenth-century monodists. In the lifetime of Bach and Handel it simply was not true, and no subsequent progress can make it true as

a criterion for their works. It is only in archaic and transitional periods that the progress of art is the progress from something imperfect towards an ideal (and presumably unattainable) perfection. A classical period is one in which the artist has perfect command of a language that can express his thoughts. If *a priori* theories inculcate that a perfect work of art is impossible, the practical experience of a classical artist's language constantly shows that the cleverest attacks on a classical masterpiece are liable to failure on some elementary misunderstanding of the meaning of the work. The term "progress" cannot be made to comprehend the art of two different mature classical epochs unless we understand by it that in one epoch the language of the art succeeded in perfectly expressing ideas within a certain range, that this range itself contained no distracting elements, and that in the other epoch the language of the art was equally successful in dealing with a different range of ideas equally free from distracting elements. We cannot even assume that the progress lies in an increase of range, for even if the later range is, as it probably must be, wider than the old, the increase of range may itself prevent the new art from directly manifesting anything like the grandeur of the old. This is unmistakably the case with Haydn and Mozart; the first eight bars of any mature Haydn quartet will contain features that would be quite inadmissible in Bach's style, and these features will amply justify their existence in the sequel, and will carry the listener into a world compared with which Bach's must seem like "Flatland" compared with space in three dimensions. Yet Haydn's quartet, even in its most serious passages, never attempts to suggest the breadth and solemnity of Bach's larger designs. Undoubtedly the opening of Haydn's *Creation*, from the introductory "Representation of Chaos" to the outburst on the words "And there was light" is sublime, and can be belittled by no comparisons; but as soon as "A new-created world springs up at God's command," Haydn strikes a note

which would be purely jocular for Bach, but which in Haydn's own new-created world rises from the chaos as a perfect expression of his sublime childlike confidence that "God will not be angry with me for worshipping Him with a cheerful heart." The sublimity of Haydn and Mozart is a lesson their contemporaries, who did not understand Bach, found easier to learn than we, whom later musical developments and revolutions have plunged back into a crude preoccupation with the "subjects" of musical compositions instead of with the compositions as wholes. But before we pursue this topic or attempt to define the revolution by which the art of Haydn and Mozart succeeded to that of Bach and Handel, it is necessary to give a summary *catalogue raisonné* of Bach's and Handel's works, for they belong, not to the mere history of music, but to the ends for which the fine arts have a history.

Handel is known to the modern public by his two greatest oratorios, *The Messiah* and *Israel in Egypt;* by occasional performances of some other oratorios; by select arias and choruses from all of them; by some charming secular choral works, of which *Acis and Galatea*, *Semele*, and *Alexander's Feast* are decidedly the most important; by many arias which time has quite capriciously sifted from the vast collection of his Italian operas; and by a large quantity of instrumental music which is now universally regarded as showing little beyond the lightest side of his work. On the whole, this selection that is known to the public represents Handel very fairly, though it does not amount to one-tenth of the bulk of his works. If Handel is misrepresented in what the public knows of him, the misrepresentation lies mainly in certain traditions of performance. The selection is intelligent enough, though a certain amount of what Handel himself would have called rubbish has become the object of the same reverential gratitude as the greatest things in *The Messiah*. But his native country has perhaps been quicker than his adopted nation to rediscover the fact that he has great powers of clear and accurate

characterisation in secular music and in such parts of his oratorios as give scope for it. The mammoth performances of our Handel Festivals reduce all this to the solemnity of Scripture lessons as read in a cathedral where nothing is audible unless it is intoned; and when English critics discover that the humour of Handel's character-drawing is not entirely unconscious, the shock provokes them to say that after all he was a "pagan," and this is considered high praise. But the man who could say that he hoped to die on Good Friday, in order to rise with his Maker on Easter Day, must have been an atrociously dishonest pagan if this, and the style of "He was despised" and the Hallelujah Chorus did not represent his inmost feelings. And it is quite untrue that these solemn things have less freshness and beauty than his pagan choruses and arias. There is quite as much dullness in his pagan as in his Christian work, only our interest in the pagan aspect is fresher. There is no dishonesty in Handel's opportunism; his immense physical industry enabled him to give the public what it wanted, but his intellectual indolence never prevented him from rising to the height of any subject that was propounded to him, and, indeed, it probably safeguarded him from taking a cynical attitude towards his art, as more than one great artist who can command Handelian bluff has been sorely tempted to do in times of transition when fashion is the only paymaster.

For many years after Handel's death his fame continued to rest at least as much on his operas as on his oratorios. Burney's reverence for Handel as a writer of religious choral music is expressed in much the same dutiful tone as one would use in speaking of the good works the Reverend Sydney Smith accomplished in his parish; it is evident that Burney turns with relief to the elegance and splendour of Handel's operatic triumphs. This we find difficult to reconcile with Burney's undoubtedly intelligent sympathy with Gluck, to whom, as to us, Handelian opera was but the embalmed corpse of Italian dramatic music. We have forgotten how

much more important it seemed to contemporaries that music should go on than that opera should be reformed. The Italian aria was the one all-pervading art-form in which every composer, every singer, and almost every player could shine. Solo-singing was in a state of acrobatic plasticity which stimulated the composer to over-production and discouraged him from subtlety of invention, much in the same way as the "gagging" comedian forces the dramatic author to become a mere scaffold-builder. Yet Handel never allowed his singers to dictate to him; when the greatest *prima donna* in Europe tried to give herself other airs than those he wrote for her, he threatened to throw her out of the window; and when the other greatest *prima donna* in Europe was in London at the same time, he performed the incredible feat of getting them to sing together in the same opera, until the public, finding this sport better than cock-fighting, spoilt it by taking sides.

The greatness which we fail (and pardonably fail) to see in all this musical dandyism, lay in its perfect command of the resources of extemporisation; every aria had a huge *da capo,* no matter how pressing the dramatic situation, and it was a point of honour for the singer to produce a different set of ornaments on the repetition; the harpsichord, at which the composer or conductor sat, not only filled out the unwritten harmonies throughout the whole opera, but was ready at any moment to increase the dramatic tension by a long *cadenza.* A famous trumpeter once rashly tried to convince the public that he could sustain a note longer than Farinelli; the trumpeter kept up appearances by breaking into a trill before finally expiring (in the technical sense), but Farinelli won by at least forty bars. This is ridiculous enough, but there is abundant evidence that these artists were great rhetoricians of a higher order; and it is very probable that the unique simplicity of Handel's style in sustained melody was inspired largely by his imagination of what such voices and vocal methods could express by sheer beauty and modula-

tion of tone without any airs and graces whatever. Undoubtedly there are whole arias and passages in which the written text is a mere skeleton, the simplicity of which proves nothing; but it is no delusion of custom that makes us feel that "Where'er you walk," "Angels ever bright and fair," to say nothing of "He was despised," have a true and perfect simplicity which is utterly intolerant of ornamentation. The great German scholar Chrysander has done the world an inestimable service in rescuing the text of Handel's works from nearly two centuries of degenerating tradition; but here his research parts company with musical instinct, and he eagerly reproduces the most deplorable ornaments from Italian singing masters of the eighteenth century, as if vulgarity were a mere question of date. The moral is, that the greatest of composers owes an obligation to his own thoughts to record them in terms which shall cover every precaution he can reasonably be expected to take against their sense becoming lost when his personal control of their execution ceases.

All the music of the first half of the eighteenth century was written on conditions that blinded composers to any sense of duty on this point. We are astounded at the immense industry of Handel and Bach, but it was not exceptional in their day. The main difference between Bach's output and that of such a famous contemporary as Telemann lies in this, that Bach's works proved, when rediscovered, to be like dramas of which we have every word of the text in perfect order and correctly assigned to the characters, but the stage directions are wanting; whereas Telemann's equally voluminous works give us nothing but scenarios. To contemporaries this would bear the construction that Bach was an exasperating pedant whose lack of confidence in his performers was justified only by his complete inability to write for them in a practical style. His almost superhuman skill as an organist was universally admitted, but no connoisseur would have considered it an excuse for so tasteless a conception as a vocal and instrumental style

that should throughout have a yet closer and richer texture than the most elaborate organ music. Why could he not learn artistic common sense from a practical man like Telemann, to say nothing of the great Hasse, whom Handel in his later operas condescended to imitate, and the not less great Graun (author of *Der Tod Jesu*, a very beautiful and still presentable Passion oratorio), from whom Handel (to save time) stole a whole chorus in *Esther?* We, of course, find all the practical common sense on the side of Bach. There are abundant difficulties in reviving his choral music: obsolete instruments; misconceptions and miscalculations as to the almost lost art of filling out a "figured bass"; the absence of directions which modern performers need on points which could not have seemed ambiguous to contemporaries; the total reversal of acoustic relations when chorus and orchestra are on a concert platform instead of in an organ gallery at the end of a church; these and many other obstacles meet us, but research, experiment, and practice remove them one and all; for in no case where the manuscript is completely preserved do we find that Bach has left out the essentials of his thought.

The most difficult problem is, of course, that of the figured bass, which was always filled out extempore on a keyed instrument. It relieved the early eighteenth-century composer of a host of problems that occupy all later composers with the balance of tone in the background of the harmony. And at first sight an aria like "Quia fecit mihi magna," in Bach's *Magnificat* certainly seems incomplete, consisting as it does of a bare instrumental bass supporting a bass voice. But in all such cases it will be found that the instrumental bass is exactly as melodious as the voice part, and that it would be the greatest possible mistake for the harmonic background to distract attention from it, though this "background" must lie above it throughout the whole piece. Here, in fact, we see Bach making excellent sense of a device which had been slowly maturing from the early days of monody; he

raises to a definite art-form the "speaking bass" which Heinrich Schütz showed us in its years of indiscretion. When the particular bass part that contains the figures is lost, then the case is unfortunate, but not so desperate as might be thought; for there are not many even plausible different ways of harmonising an elaborate melody that lies in the bass, and where there is an alternative there is plenty of evidence elsewhere in Bach's works that he would welcome a variety each time the passage recurs. All this is on quite a different footing from the habit of leaving blank spaces in the design of an aria or recitative, so that the singer may extemporise *cadenzas*. Handel, Bach, and Beethoven were undoubtedly the greatest extemporisers music has ever known; and Bach is the first composer who in his instrumental works and vocal solos relegated extemporisation to the background.

The work of Handel which survives and entitles him to his place among the greatest of artists, is, when we come to reckon it up on this basis, literally the work which he condescended to record. He could not leave the details of a chorus to be extemporised in performance, no matter how pressed for time he might be; so when he was in a hurry with a chorus he had to choose between copying an old one or composing a new one, details and all. No contemporary could be expected to see the immense difference between the work which, for whatever reason, was put on a permanent basis, and that in which most of the inspiration lay in the performance. Utter oblivion has now engulfed all Handel's operas, and has cast up only a dozen or so of arias which seem much happier in their present freedom than in their original context. Handelian opera has been described as "the darkness before the dawn" of dramatic music, and Handel has been sternly denounced for wasting the prime of his life in upholding the tyranny of its conventions. But it is quite possible that Gluck would have had far more difficulty in achieving the reform of opera if no great master had

kept it alive in its unregenerate state. The real question at issue was not whether Handelian opera was an undramatic monstrosity, but whether music could be or ought to be dramatic at all. Bach evidently thought not; he held aloof from opera, and his music is dramatic only in the metaphorical sense in which epic poetry, scenery, or the situation of a castle is dramatic. Actual drama requires of music a capacity for changes of movement and texture which are obviously illegitimate on the terms of either Bach's or Handel's musical language. Handel's easy eclectic methods enabled him to advance with his times: it has been already mentioned that in his later operas he began to imitate Hasse, whose technique forms in many respects a link between Handel's and Mozart's; but the link was merely a fatal weakness in the chain. Where Handel imitates Hasse he is more than usually perfunctory, and Mozart's devotion to Hasse as a model begins in his seventh year and becomes unrecognisable before his sixteenth.

In gaining a certain kind of freedom and variety of movement, the progress represented in vocal music by Hasse (whose wife was the great singer Faustina), and, somewhat later, in instrumental music by Boccherini, meant little more than the loss of the architectural character and power of those art-forms that had so far been perfected. No one before Mozart seems to have grasped this except Bach, Gluck, and Haydn. Bach saw the inmost character of the old forms, and by cultivating a very strict sense of the special *allure* and structure of each he acquired as a normal mark of his style that power and inevitableness of movement which Handel shows only in his most inspired pages. Not that Handel's work ever breaks down as the work of seventeenth-century composers almost always did; but too often Handel will begin a piece beautifully and then let it merely roll by gravity down to its long-winded but obvious conclusion; whereas Bach at his most ordinary level is himself interested in his task, and does not fail to communicate his interest to us if we repeat his experiment

by producing his work under proper conditions. If as much as one-tenth of Bach's complete works is markedly inferior to the other nine-tenths, that is a large estimate. Certainly not one-tenth of his choral work is widely known, but, apart from the obviously monumental B minor Mass and Passions, there is nothing but accident to determine why this dozen rather than some other dozen of the two-hundred-odd cantatas should have become specially famous since their publication began in 1851. His instrumental music was not so long lost from sight by cultivated musicians; within twenty-five years of Bach's death, Mozart was exploring the *Wohltemperirtes Clavier;* and Beethoven knew it by heart, though there is evidence that he misconstrued it on almost every possible point where our completer knowledge of Bach's style can throw light. In England Samuel Wesley was ahead of all Europe in his enthusiasm for Bach. The rediscovery and publication of Bach's choral works, which we owe primarily to the impulse of Mendelssohn, is nothing less than the discovery of a complete musical language, an æsthetic system hardly less exclusive and coherent than the most perfect single work of art produced under its laws; a system, moreover, which is in no way imposed on the works from without, but which has been as surely and habitually made afresh by each single work as a living body makes its own bones and organs and muscular and nervous systems. If we wish to find the meaning of some early eighteenth-century art-form in perfect and purely musical clearness, we shall find it in Bach. If we wish to understand what some struggling musical prophet of the seventeenth century had in view, we shall find his wildest visions realised, in a far more astonishing because perfectly convincing form, by Bach. And we shall constantly find our most modern ideas anticipated by him. But what makes him the most modern of all classics is just his accurate sense of the limitations of his language and of its art-forms. He can never give us an antiquated answer to an artistic question, for he brings

all questions into the limits set by his own art, and then tells the whole truth within those limits. If we ask him, "Can music move in such a way as to deal with dramatic action?" his answer is, "I do not write operas."

V

Mere ease of movement could not suffice to solve the problem of making music genuinely dramatic; but at the outset ease was more important than power. Bach's music moves like the stars in their courses; such power is beyond the reach of dramatic music until it has grown to its fullest Wagnerian stature. Gluck (1714–1787) learnt his technique in Italy in a school not radically different from that of Handel, if Handel can be said to have had a school. Sammartini trained Gluck to write operas which, when produced in England, elicited from Handel the remark, "Gluck knows no more counterpoint than my cook." The criticism was true and, as applied to Gluck's early work, quite fair. Handel's cook happened to be a very good singer, and Gluck's first operas have no dramatic merits to compensate for their poor texture. The important thing which he learnt from Sammartini was neither counterpoint nor a truly dramatic style, but a certain special interest in the effects of vague masses of contrasted tone obtainable rather at the expense of real polyphony than with its aid. This kind of musical impressionism had been a feature of Italian instrumental music from its earliest times; the *concerto grosso* was an art-form in which it had free scope; and Handel's more indolent overtures and concertos show it as a concession to popular taste; but Gluck learned from Sammartini's chamber-music that what is mere daubing in an easel picture may be high art in scene-painting, and that the word "theatrical" as a term of abuse loses much of its force when applied to the stage.

It is impossible to exaggerate the importance of Gluck's achievement in dramatic music; indeed its bearing on the

nature of music in general has been rather ignored than over-emphasized. But Gluck's own claims have been treated with far too simple a faith in his accuracy and in the simplicity of the operatic problem. In the first place, a very large part of the problem must be solved in the poetry before a note of the music can be written; and here Gluck owes a great debt to his librettist Calzabigi, who had the courage to revolt against the authority of the all-powerful Metastasio, a poet who still commands the respect of students of Italian literature though all his works were written as the libretti of operas, not one of which could now be successfully revived. In the second place, Gluck was very much the same kind of opportunist as Handel, though he had so clear a consciousness of his dramatic mission. He had, when inspired by a favourable dramatic situation or emotion, a really sublime vein of melody, but no great technical mastery either of counterpoint or of connecting links between one idea and another. Here his lessons in Italian impressionism proved very useful; indeed they are summed up in his own statement in the famous and doctrinal preface to *Alceste*, "that the number and character of the instruments ought to vary with the passions and climaxes of the drama," instead of forming purely decorative designs as in the works of Bach and Handel.

All this might make even his maturest work still seem helpless child's-play to a solid polyphonic master like Handel (who, of course, saw only his earliest works); but it forced him to economise his energies in many ways which require some explanation before they can be harmonised with the popular notion of Gluck as an eighteenth-century Wagner. History deplores that long after his first "reformed" operas he continued to earn an honest living with works in the bad old style; research shows that his greatest operas draw freely upon these presumably reprehensible works for quite important features. The famous Parisian war between the Gluckists and the Piccinnists is often supposed to be a contest between the new opera and

the old. Piccinni's own avowals, no less than his music, show that he was only too anxious to imitate Gluck in any points on which his own gifts and the incessant pamphlets and criticisms of the time could enlighten him. As a matter of fact, the whole controversy was on no clearer issue than that between French and Italian music; in the reign of Louis XIV French music was represented by the Italian Lulli, and now, in the reign of Louis XVI, it was represented by the Austrian Gluck. Germany and German-speaking musicians still had much to learn from Italy; but in the essentials of dramatic music both Germany and Italy were now to find in French criticism their greatest stimulus. We must admit this, but at the same time we must not forget that Gluck's first three reformed operas, *Orfeo*, *Alceste*, and *Paride ed Elena*, were produced in Italy before he came to Paris. *Orfeo* is the most perfect of all Gluck's works; it was already so in its Italian version, and it lost more than it gained when it was forcibly adapted to the French conditions of performance. *Alceste* was so rewritten for Paris that an entirely new work would probably have given Gluck less trouble; it created great controversy, and Gluck learnt more from his experiences with it than from all the rest of his life's work. *Iphigénie en Aulide* and *Iphigénie en Tauride* are very great works; they show the fruits of his experience with *Alceste*. Neither of them maintains throughout the grandeur of invention which distinguishes *Alceste*, and both show occasional signs that the doctrinaire dominates the musician without much gain to the drama. There is fine psychology, worthy of Wagner's subtlest use of *Leitmotif*, in the famous passage in *Iphigénie en Tauride* where Orestes gasps, "Le calme rentre dans mon cœur," while the agitated orchestra belies him; but the greatest things in *Orfeo* and *Alceste* are just as true to life and infinitely harder to describe in words. *Armide* is the last of Gluck's great works, for *Echo et Narcisse* is a failure. The most remarkable external fact to note about *Armide* is that Gluck here found it possible to set without

much alteration a libretto by Quinault that had served Lulli ninety years before. There is more pageantry than pathos to be obtained from even the most natural treatment of the subject; and Quinault's poem had great merits. But Gluck's magnificent success with it shews that the problem of opera could be solved with material that was very different from any that would have met with his approval in the first days of his greatness when he worked with Calzabigi.

Meanwhile a transformation was taking place in instrumental music. It is impossible to say whether Gluck's dramatic power or the new sense of movement in the symphony and sonata came first in point of time. But quite certainly neither consummation would have been effected without the other. The transformation in operatic music is the easiest subject to discuss; but, as in the monodic revolution a hundred and fifty years earlier, it hides the purely musical facts in billowing clouds of literature. The radical change in the inmost nature of music itself is clearly revealed only in the history of the *sonata*, a term which happens to be applied only to solos and duets, but which quite accurately covers the universal form of almost all instrumental music, including trios and symphonies, from the time of Bach's own sons to the time of Brahms, and even, among composers who have not quarrelled with classical traditions, to the present day.

Instrumental compositions had been called *sonatas* from the earliest days when a term was needed to distinguish music that was merely "sounded" or played, from cantatas which were sung; and Bach, like all his contemporaries and predecessors, uses the term for art-forms as purely decorative in scope and polyphonic in texture as the rest of his work. But when we nowadays speak of the "sonata style" we mean something wholly undreamt of by any Latin artist, though the Italians furnished the entire raw material for its technique, and something wholly untouched by Bach, though he not only used its formal outlines on a

small scale, but definitely encouraged his sons to regard his own art as obsolete. His own words, spoken without any bitterness, were "The art has attained a very high position; the old style of music no longer appeals to our ears." Only in Germany could an artist so generously acknowledge the success of a new train of thought definitely hostile to his own methods; and only Bach could continue to the hour of his death to develop his own ideas as if the acknowledged high position of the new art concerned them no more than the acknowledged high position of the Emperor of China concerned Frederick the Great. Sebastian Bach has his reward now; and in our indignation at the eighteenth-century connoisseurs who ignored Sebastian, but gave Philipp Emmanuel Bach (1714–1788) almost as much sympathy as he deserved, we are apt to show great injustice to a sincere and subtle artist who faithfully obeyed his father's advice and earned the boundless reverence of Mozart, who used unprintable language about any musician who did not see in Philipp Emmanuel Bach his spiritual father. Beethoven, too, regarded him as a classic.

As so often happens in artistic history, the works of Philipp Emmanuel which have most clearly made history are not among his best works of art. The track ceases to be new when it is properly beaten; and when we are following the steps of the pioneer we are more interested in the traces of the woodman's axe than in the beauty of the scenery. There is one way in which belated justice might be done to Philipp Emmanuel, and that is a way which would also go far to placate the outraged *manes* of Mozart and Haydn. We use the "easy" pianoforte works of these two great masters as school-music for children; and the difficult early sonatas of Beethoven are also turned to the same purpose. With Haydn there is something to be said for this plan, though the easiness of his best works is treacherous; but Mozart is never really easy except in slow movements, and in his pianoforte sonatas these, like Haydn's, are mostly a style which is neither intelligible to children at the moment nor

calculated to lay down a store of early impressions that may acquire meaning to them in later life. Instead of spoiling Haydn and Mozart by familiarising children with a selection that totally misrepresents their styles and makes them odiously difficult as well as childishly ineffective, why do we not revive in musical education the true life's work of Philipp Emmanuel Bach? It is genuinely easy, for difficulties are avoided with that sketchiness which was to contemporaries the supreme virtue of artistic tact, though to us it is a flaw fatal to the permanent perfection of art; but with all its sketchiness, the best of it yields results far fuller and more satisfactory to young ears and comfortable to small hands than the pianoforte *parerga* of Mozart and Haydn, which the ripest artists find full of subtle treachery. Again, Philipp Emmanuel Bach's style combines an almost boyish rhetorical enthusiasm with a truly poetic pathos more exactly suited to the comprehension of children than any other musical experience except that of listening to great music without thinking of sharing in its performance. If musical children were allowed to learn an artistic and not merely historical selection of the works of Philipp Emmanuel Bach, they would come to understand both his father and his spiritual descendants through a language into which he put his whole enthusiasm, a language which links the old art with the new and cannot possibly spoil the taste for either.

It would be a mistake to ascribe the whole revolution in instrumental music to Philipp Emmanuel Bach as we undoubtedly must ascribe to Gluck the revolution in opera. More than one of Sebastian Bach's other numerous sons had a share in the matter, and Gluck himself, by his devotion to opera, gave a concrete and extra-musical interpretation of problems which, if strictly confined to "absolute" music, might have become so abstract as to lose meaning. In point of fact, out of the singularly rapid and quiet revolution which separates the age of Bach and Handel from that which has been aptly called the Viennese

period, there arose neither more nor less than the unquestionable supremacy of "absolute" music. Sebastian Bach's instrumental works are indeed among the greatest things in art, and for over a century they were the only music by which he was known; so that Germany may be said to have achieved in him that undisputed command of music in its completest purity which she still retained within recent memory in the person of Brahms, whose legitimate successor is believed by a wide circle of serious musicians to be Max Reger. But the discovery of Bach's choral works proved that not even his greatest instrumental music attains the highest summit of his art; it may demand higher faculties in the listener than those which suffice for the enjoyment of the most complex choral work, but Bach's choral work does not give the highest faculties any the less scope in consequence of its intelligibility on a lower and less purely musical plane. On the contrary, all his art-forms, except the toccata, the arpeggio-prelude, and the suite, attain their full scope in choral music. With Mozart (1756–1791), Haydn (1732–1809), and Beethoven (1770–1827) this is no longer true, nor can we argue that what has happened is a decline in choral art. Mozart's choral technique is fully equal to Bach's or Handel's; indeed it combines the contrapuntal richness of the one with the practical convenience of the other. The only reason why it so rarely utters anything worthy of its powers is that Mozart's main interest lies elsewhere. In the problems of comic opera he found scope for faculties greater and more subtle than even the tragic power of Gluck; and it is a cardinal error of criticism to suppose that *Figaro* and *Don Giovanni* are less great than they would have been if their subjects had been solemn, or if, being what they are, the music had made the most of their capacity as a vehicle of social satire. Nor is the "absolute musician" nearer to the truth when he says that Mozart's operas owe to their contemptible libretti only the freedom to become absolute music by disregarding their text. Like all the greatest music

from Palestrina to the last seven works of Wagner, Mozart's music neglects nothing that comes within its range; without the aid of any *a priori* theory it instinctively and inexorably searches out the truth, and its life is as wonderful as the grasp of a baby's hands. To turn from Mozart and Haydn to Beethoven is like turning from the contemplation of childhood to that of manhood; but it has no sort of resemblance to the duty of "putting away childish things." A subject apparently so trivial and so remote from serious literature as the musical and dramatic resources and problems of Mozart's wretched libretti proved quite important enough to occupy years of the devoted research of Otto Jahn, no mere musician, but one of the greatest classical scholars modern Germany and modern scholarship in general has known. Such is the transfiguring power of great music on the most unappetising raw material that comes to it from without; and this transfiguring power has never been shown except in as far as the music has completely and conscientiously absorbed that material.

But if Mozart's operas are greater than his choral music, it is impossible to say that they show his greatness in as lofty a sphere as that of his quartets, quintets, symphonies, and concertos. Perhaps the operas need a higher faculty for their understanding at the present day; since grave damage has been done by the acceptance of that doctrine of connoisseurship that ignores their dramatic aspect. But the highest faculties that find scope in Mozart's operas have an incomparably wider field in his instrumental music. One of the easiest ways in which this may be measured is to take the short instrumental passage which accompanies the duel at the beginning of *Don Giovanni*, and to look for passages like it in Mozart's instrumental music. In the opera the passage is perfectly adequate to the excitement and calamity of the situation. In no instrumental work written after the age of seventeen does Mozart take such a passage seriously.

One of the most insidious false impressions which infest

our ordinary notions of classical and modern music is the idea that the stage demands a more intense form of musical expression than is legitimate in purely instrumental music. This is a point on which even a student whose whole bias is against paradox will be compelled, as soon as he studies the facts, to decide that the truth is exactly contrary to popular opinion. Away from the stage the effect of staginess is invariably cold, not necessarily because we "see through it" and think it extravagant, but always because, whether this be so or not, it is inadequate. And on the stage the composer's chief difficulties may be brought under two categories: firstly, those which arise from the fact that a little dramatic expression in music goes an incalculably long way; and secondly, those which concern the control of the movement of the music. In Mozart's operas both these types of problem are solved with an exquisite tact by the aid of devices and forms which are never so dangerous a stumbling-block for hasty criticism as where they seem most conventional. Throughout his short career his vision of the inner nature of music seems to become steadily clearer in whatever art-form he works, until in that strange masonic pantomime, *Die Zauberflöte*, operatic music becomes almost as ethereal as a string quartet, and its most antiquated conventions, as shown in the vocal fireworks of the "Queen of Night," become subtleties of character-drawing and symbols of political satire.

Before half of Beethoven's career was run the dramatic power of music had in his hands blazed out with an intensity that very nearly withered operatic art for ever. Eminent critics, and nearly all orthodox Wagnerians, have expressed the opinion that the music of Beethoven's *Fidelio* is not genuinely dramatic. We cannot begin to understand *Fidelio* until we face the fact an experienced master of opera like Mozart would never have accepted a libretto so elaborately designed to spoil a good story by introducing each piece of music at the most awkward possible moment, and to spoil good music by the mere effect of resuming

the story. The two first versions of the work as *Leonore* in 1805 and 1806 were almost failures, but in 1814 a very clever dramatist made extensive improvements in the libretto, which, while leaving grave defects and obscurities in the first act, made success possible for the work as a whole; so that, as *Fidelio*, it has become a unique feature in the repertoire of classical opera, successful in the teeth of all orthodox operatic criticism, and strangely powerful in its emotional effect. When critics tell us that its music is dramatic only as the D minor Sonata, Op. 31, No. 2, is dramatic, they express a truth by inversion. What they ought to say is that no libretto could match the tremendous dramatic power of Beethoven's sonatas and symphonies until a Wagner could arise who might have given Beethoven a libretto—if Beethoven had been Wagner.

The problem may be accurately stated on an entirely prosaic basis thus: To act a good story on the stage is a matter of hours; to go through the whole gamut of its emotions, subtle and great, simple and complex, in purely instrumental music, is a matter of ten minutes. So fierce, indeed is the concentration of movement and design in the sonata forms that a single design in the most highly organised of these forms cannot stand alone. The sonata is divided into three or four complete sections or "movements," none of which allude to the themes of the others; and, historically, this division may be traced to the grouping of the dance tunes in polyphonic suites and of other purely decorative movements in the earlier types of sonata. But æsthetically, the division of Haydn's, Mozart's, and Beethoven's large instrumental works into these sharply defined sections has a deeper meaning. It means that if we are to be whirled through the complete emotions of a drama in ten minutes, we must be given time to dwell upon various reactions from these emotions. It is as if we were told the story in one movement, allowed in another movement to live with some of its characters in their daily life, shown in a third a glimpse of the wider world in which they lived.

and so on in many different combinations. One striking result of this is that though Beethoven is unmistakably the greatest master of tragic expression music has ever known (being approached only by Wagner and Brahms), there are not more than three of his works in sonata form where the finale ends in gloom. The only three cases are the C sharp minor sonata (commonly called *Moonlight*), the sonata in F minor, Op. 57 (commonly and not inaptly called *Appassionata*), and the marvellous C sharp minor quartet, which ranks with the Ninth Symphony and the *Missa Solemnis* as among the greatest works in all music. But it is important to note that there is no weakness in the conclusions, gentle, humorous, happy, or triumphant, of other works, such as the quartets in F minor and A minor, the Fifth and Ninth Symphonies, which are rooted in quite as profound a tragic emotion as the *Sonata Appassionata*. The inexorable progress of the tragedy has been told in the first movement: the logic which governs the sequel is not the logic of cause and event, but that of emotional reaction.

We are now in a position to see what is really meant by applying the term "absolute music" to such works. I have dwelt on the history of opera because it gives us the best external evidence as to what music means in so far as it is translatable at all. But Beethoven proved that utterly untranslatable music for instruments, without any external "programme" to guide the listener, could be a more powerful poetic language than had ever been dreamt of in art before him. Opera had already begun, in the hands of Rossini, to show that its surest success was compatible with a grave taint of vulgarity; and the early death of Weber in 1826 after his three noble triumphs, *Der Freischütz*, *Euryanthe*, and *Oberon*, deprived music of the only master, except the austere Cherubini, who combined stagecraft with a musical power pure enough to redeem opera from the degradation into which the vigorous but base talent of Meyerbeer (1791–1864) was plunging it. Meanwhile, in Beethoven's sonatas, chamber music and

symphonies, we have a perfect dramatic art before which all opera, except Mozart's and Wagner's, pales its ineffectual fires as surely as the most ideal operatic libretto must be put to shame by Shakespeare. For this very reason, all attempts to translate Beethoven's music by a "programme" are doomed to exasperating failure; such translations are as futile as a translation of Rheims Cathedral into Greek prose. As an expression of a poet's mood, Shelley's poem *To a Skylark* is not less accurate for containing few statements that ornithology can conscientiously endorse. Poetry is sometimes hardly less "absolute" than music, but, like music, it gains instead of losing accuracy thereby; and, as the history of music shows, no art ever became "absolute" by cultivating an ascetic and *a priori* neglect of what its accessories, verbal, pictorial, or functional, suggest to it.

VII

In only one branch of music did Beethoven not show himself supreme; for in his *Misa Solemnis* and the choral finale of the Ninth Symphony he undoubtedly triumphed in his rough-rider's attack on the long-neglected problems of choral music. But in lyric music, that is to say, in songs and small instrumental pieces, his only significant work is the beautiful *Liederkreis*—which, strictly speaking, is lyric only in its individual sections, and cannot be taken as less than a large whole—and a very few other scattered songs, together with some small and extremely interesting but unequal collections of pianoforte "Bagatelles."

Beethoven's lifetime coincides with much of the greatest period of German poetry, and some speculation has been wasted on the question why Goethe had to wait for younger and later composers before any musician seemed to understand his poetry, as far as can be judged by their attempts to set any but its lightest utterances. Such speculations are as idle as Swift's complaint of the inadequacy of Homer's dissertation on tea. The things music can under-

take at any one epoch seldom coincide with the literature or politics that may reasonably be expected to interest the musician. Most of Beethoven's vast extension of the range of musical expression has been ascribed to the French Revolution. Why did the French Revolution have so little effect of that kind on the composers who lived in France? Emotion can no more help music to express a type of thought for which it has no technique than torture can help a colour-blind man to tell red from green. Sometimes the technique grows evidently in response to a demand; sometimes a single man of genius seems to be born with it; but there is no ground for relying on his being born as soon as he is wanted.

Schubert (1797–1828) was born remarkably *a propos*, and his genius for genuinely lyric song is meteoric enough to upset any chronology. It is wonderful that a boy of seventeen should have composed the classical setting of Goethe's *Erlkönig*, though that obviously effective and cleverly rationalistic essay in the modern ballad is just what might be expected to inspire a talented boy with something akin to it. But this same boy had already at the age of sixteen composed the classical setting of the song, "Gretchen am Spinnrade," from *Faust*, and how he had come to find perfect expression for that poem no mortal will ever know. His setting of it rings true in every detail, and there is nothing in any earlier music that could have served him as a model. It is hardly necessary to say that the operatic aria, whether of Handel's or of Mozart's type, could not give much help to the composer of truly lyric poetry; the problems were almost entirely new, and Bach is not more remote from Schütz than the inspired songs of Schubert are remote from his own careful imitations of the clever pioneer work of Zumsteeg (1760–1802), from which he steadily advanced in a long series of essays, illuminated more and more frequently with a blaze of genius, until he stands in the record of some six hundred songs as the first and greatest classic of lyric music. He is more than that; possibly he could other-

wise not have been as much. He wrote several operas, none of which attained a performance; and though they contain beautiful things, they prove that he had an actual lack of talent for musical drama. Beethoven in *Fidelio* showed inexperience, but Schubert in *Fierrabras* shows positive obstinacy and want of common sense. Yet in the sonata forms his genius, though wandering and undisciplined, shows that his scope was not merely lyric. The openings, many passages in the developments, and nearly all passages of which the function is to return to the opening theme, show that his large instrumental works have a sublime impulse as their motive power. The works are notoriously too long, and, except in movements of lyric form, diffuse and weedy in build; the sublime passages lapse into the picturesque, the picturesque passages become pretty, and the prettiness may become trivial ; but at the weakest moment the tide may turn, and the reverse process may almost delude us into the belief, so dear to "romanticists," that such art owes to its weakness a charm which is denied to mastery.

The Romantic Movement in music is a favourite topic, but it is no such solid fact in music as it is in literature; and the contrast between "classical" and "romantic" has given rise to some of the stupidest fictions in musical criticism. Schumann (1810-1856) steeped himself in the thoughtful and profound humour of Jean Paul Richter and E. T. A. Hoffmann, and evolved a new style of pianoforte music which, by means of epigrammatic abruptness and pertinacious antithesis, proved capable of development on a large scale without need for attacking the higher problems of composition. His happy marriage inspired him with a gift for song second only to Schubert's; and the steady growth of his experience as musician and critic led him to adapt his avowedly sententious and discursive style to a peculiar treatment of the sonata forms both in chamber music and in symphonies. His method, which was in essence an artificial simplification of the problems, proved

remarkably successful, and in some cases (as in the D minor symphony, with its uninterrupted series of movements with themes in common) opened up new possibilities. Later he devoted himself to choral and dramatic music, with less important results on the whole, his opera *Genoveva* being a forlorn hope, and his Mass and Requiem being quite unknown. Yet at least three voluminous works have a really distinguished place in music. *Paradies und Peri* is a huge cantata (the words after Thomas Moore) which raises an honestly sentimental prettiness to heights of real beauty. The overture and incidental music to Byron's *Manfred* is undeniably great, if not greater (as it is certainly deeper) than the poem; and it is a thousand pities that incidental music to a play should, at least in England, be totally inaccessible to the public even when the play is on the repertoire of any theatre. Lastly, those parts of the incidental music to *Faust* which were written before Schumann's mind failed are the only music on that subject, except Wagner's *Faust-Ouvertüre*, which can honestly claim to be fit company for Goethe's poetry. Berlioz's *Damnation de Faust* is undoubtedly a work of genius, but the paper has not been made which could record unscorched what Goethe would have thought of the silly devil-worship and schoolboy cynicism of Berlioz's degradation of his drama. With Gounod's *Faust* we reach the sphere of eminently successful opera, and can feel magnanimous enough in recognising its many civic and domestic virtues without dragging Goethe down from Olympus to the boulevards. Beethoven intended some day to write music for *Faust*, as he had already done for *Egmont*. He died before he had even begun to sketch his project, but, thanks to Schumann, a true music for *Faust* exists, and is as German as the poem.

There is no opposition between classical music and Schumann's romanticism. If his literary interests led him to evolve special art-forms for his peculiar ideas, that is precisely what every great classical composer did, whether their special interests were literary or not. If his applica-

tion of his style to larger and older forms imposed an artificial restraint on them and sometimes warped them to uncouth shapes, there is nothing romantic or free in that. If some of his most characteristic pianoforte music seems most formless where it is most successful, then we have a true classic in a new form, with a classical perfection of union between form and matter. To complain of the prolixity of the *Humoreske*, or even of that much more responsible manifesto the *Fantasia*, Op. 17, is like complaining of the digressions and delays in *Tristram Shandy*. In literature it is possible to insist on a narrower definition of "classical" than that criterion of organic unity that I have assumed here. In music it is not possible; the art is too young. To-day the rising generation may still remember to have spoken with people who were married before Beethoven died. It is not merely in our own day that the turmoil of music is too near to us to let us distinguish the really vital issues from the trivial. The whole history of music from the time of Bach to that of Richard Strauss is the history of one age which only a too close proximity impels us to divide into three or four with mutually incompatible ideals. The kind of classicism against which the romantic musicians can be ranged as in opposition was one of the most radically and subtly un-classical things in art. Its real representative was Spohr (1784–1859), who, in spite of a cloying mannerism, had a really splendid fund of melodic invention, by means of which he could make one unvarying set of formal habits serve the purpose of a number of works in a surprising variety of forms, some of them externally new, and all of them effective. In France and Italy this kind of mastery has always been firmly believed to partake of the essence of classical music; all higher mastery is either identified with it, or ignored, or else treated as anarchic. Fortunately the German musical temperament, though devoted to logic, does not so eagerly demand that the logic shall assert itself whether the facts are ready for it or not; and Spohr himself could show more breadth of

mind in his actions than in his music. It is remarkable that he should have been the first not only to praise, but to produce Wagner's *Der Fliegende Holländer*.

Spohr's domination over European music was formidable, but it was surpassed by the far more genial influence of Mendelssohn (1809–1847). To call Mendelssohn a pseudo-classic is hard, but there is no doubt that pseudo-classicism was the result of his work in every corner where it penetrated. One brilliant critic has compared him with Jane Austen, and certainly the overture to *Antigone* is remarkably like the tears and tremors of Miss Marianne Dashwood in *Sense and Sensibility*. But when did Jane Austen show the slightest sign of mistaking Marianne Dashwood for Antigone? There is something wrong with Mendelssohn's art (except in its far from negligible great moments), and the wrong has little or nothing to do with the range of his style, whether in successes like the *Hebrides Overture* and the good things in *Elijah*, or in failures like the *Reformation Symphony*. It is characteristic of more than one art and trend of thought in his time, and it consists mainly in a misplacing of the sense of duty. In life and conduct the sense of duty makes us rise above ourselves with an effort; otherwise the doing of our duty is indistinguishable from habit or even pleasure. But the one supreme duty of a work of art is to be itself; and the moment a sense of duty enters and tries to lift it higher, the effect is insincere. Great injustice may be done if we impute the insincerity to the artist; all the evidence goes to show, for example, that Mendelssohn was one of the sincerest men that ever lived—no artist ever came under his personal influence without being the better for it, and Schumann adored him.

It is quite arguable that Mendelssohn's sudden and early death was one of the greatest calamities in musical history, and that it deprived us of the real revelation of a musical genius whom we positively know to have been as gifted as Mozart, but who had so far never come to grips

with the real problems of his art. Certainly if Handel's career had been cut short at the same time of life as Mendelssohn's, we should at this day know nothing of him but that he was an infant prodigy, became immensely fashionable, and showed, to any who should have the curiosity to dig out his works, an ease and mastery which he might have exercised to great purpose if he had chosen.

Whether the death of Mendelssohn was a calamity or a safeguard from sadder disillusion, there is something painful in the reaction against his influence. As the sense of duty in Mendelssohnianism was inartistic, so was the self-conscious freedom in musical Byronism. Moral indignation about purely artistic matters absorbed criticism in personalities and tragically severed the greatest representatives of the deepest German musical culture from those not less ardent souls whose ideas were less abstract. Yet all were agreed in working in a "romantic" spirit; there was in the lifetime of Schumann little opposition either to descriptive music or to new art-forms as such. But there was grave doubt as to the sincerity of the chief pioneers; and no candid historian can to-day blame the doubters, though he may deplore that one injustice produced another.

If only the art and style of Liszt (1811–1886) had been more independent of limelight, personal magnetism, and pose; if only the early works of Wagner (1813–1883), up to and including *Lohengrin* (1847), had not shown vulgarity in their most successful features far more positively than they showed a general tendency towards his ideals; how much simpler the history of mid-nineteenth-century music would have been! As it fell out, we can afford at this time of day to realise on the one hand that the purification of Wagner's art when he began upon *Der Ring des Nibelungen* was one of the most astounding events in musical history; and, on the other hand, that, once it was accomplished and accepted, there was grave intellectual dishonesty or æsthetic blindness in the attitude of Wagnerians who insisted on treating things like the end of the overture to *Tannhäuser* and the

introduction to the third act of *Lohengrin* as if a composer of high ideals had any excuse for writing them. As a composer, Wagner was two people, and only the firm coherence of his development as his own librettist holds the two together. They differ not as Haydn differs from Beethoven, not as early Beethoven differs from late, but as Gounod differs from Goethe. *Rienzi* has the sincerity of a young barbarian who knows no better than to break all records in the piling-up of stirring dramatic effects. It was an immense success. *Der Fliegende Holländer* hardly seems to be by the same composer, so entirely new is its power and so bold its continuity of dramatic movement. It is incomparably the most sincere of his earlier works; and though the poem of *Tannhäuser* shows an advance in real scope, its music shows a more ambiguous advance in mere ambition. It is strange to see how it alternately repelled and attracted Schumann, who had been moved to real moral indignation by the best and most nearly sincere of all Meyerbeer's works. *Lohengrin* begins and ends with ethereal beauty; the poem is excellent stagecraft and, no less than in Wagner's earlier works, far beyond any classical or contemporary libretto as literature. But most of the music seems to have settled down to a safe and uniform ambling movement which, while not noticeably breaking down, gives but a negative solution of the great musical problem which underlies all Wagner's work from its first inspired enunciation in *Der Fliegende Holländer* to its perfect solution in various parts of the tetralogy of *Der Ring des Nibelungen*, in *Tristan und Isolde*, *Die Meistersinger von Nürnberg*, and *Parsifal*.

The reader will not find this problem difficult to formulate after what has been said of Gluck and of the time-scale on which the sonata style moves. We have seen that in the musical language of Beethoven a complete design, with a complete series of dramatic contrasts, can be made to run its course within ten minutes, and we may add that it can seldom be sustained for more than fifteen

without breaking down. Obviously, then, such music can be fitted to the far slower progress of a stage drama only by a series of conventions which give the music a clear right to stop and begin again whenever it has need of a pause. Wagner's ultimate musical question comes to this: Can music be induced to cover the wider time-scale of drama *pari passu?* If it can, then its sequences and climaxes will be as far beyond the scope of Beethoven's art as Beethoven's are beyond the scope of Bach's. Wagnerian *Leit-motif* (the system by which musical phrases become associated with the innermost and outermost threads of the dramatic thought) is but the most obvious of the many means by which Wagner grappled with this task. The orthodox account of Wagner's task is wrapped in a glorious veil generally known as *das Allkunstwerk*, or union of all the arts in one focus. This conception, though it seems far more stupendous than the humble musical proportion-sum given above, resolves itself into the obvious facts that Wagner was his own librettist, that he insisted on looking after every detail and every accessory in the staging and acting of his works, and that in the Bayreuth theatre we see the astonishing amount of organisation and of practical and scenic resource that he actually invented. But for all this, for all his importance to German literature as a poet, to German sociology as an agitator, and to German philosophy as a disciple of Schopenhauer and a stimulus and irritant to Nietzsche, he is and remains infinitely greater as a musician than as any other kind of artist or thinker. And he solved his musical problem. The effects upon musical history were curious, for the risks that he took had not been heard of since the end of the seventeenth century, and musicians either declared them insanely illegitimate or else sided with Wagner by denying the risks in full view of accomplished disasters.

The risk that Wagner took was that of an obvious breakdown in the course of his immense new sequences and climaxes. In other words, patchiness is a danger which

besets every attempt to establish a new scale of dimensions in an art. Purcell (1658–1695) and Buxtehude (1637-1707) were always patchy unless they could use a *basso ostinato* to keep their music spinning by repeating itself over and over again as a cumulative effect. With the advent of Bach, patchiness became an inadmissible fault, not merely in the music of great masters, but in any music that was presentable in public at all. The unevenness of Schubert's larger instrumental works is not patchiness. Unless we view the music from such a distance of memory that its actual length ceases to affect our impression, we can accuse Schubert only of too easy and monotonous a flow. Again, Schumann's evasion of the higher problems of composition was managed, as it were, by a charming gesture of acknowledgment that such problems existed. Classicists like Spohr had an infallible recipe for each problem; Mendelssohn had a Handelian instinct which sometimes worked miracles and never led him into difficulties: showmen like Meyerbeer could get out of a tight place by firing off a cadenza or by covering their retreat with a military band behind the scene. But Wagner had the sublime impudence to let his music attempt the obviously impossible, break down if it must, and go on again as if nothing had happened. One result was that it is only quite recently that even Wagnerians have sufficiently realised that he does not always break down, that the break-down is no essential feature of his art, and hence that the obviously impossible effort in one act of an opera may turn out to be a case of *solvitur ambulando* in the next. In his very first effort at the true solution of his problems, he accomplishes a scene fully half an hour long, or twice the length of the longest single design in classical music. I refer to the opening of *Das Rheingold*, where the music is perfect in its coherence and swing until the beginning of the second scene, where Fricka awakens Wotan and makes the music talk business with infinite embarrassment, though there are signs that it would recover its self-control the moment Fricka and the giants

gave it a chance. Again, the first and third acts of *Die Walküre* show no lapses of composition, though one fills an hour, and the other an hour and twenty minutes. I do not say that this is not too long, but simply that it does not break down, as, for instance, some passages in Wotan's monologues in the second act do break down even before they threaten to be lengthy at all.

It is sad that the patches in Wagner's greatest works should have so far made more mark on recent music than the wonderful fact that his music often accomplishes its aim of spanning, like the rainbow of Walhalla, spaces vast enough to include the whole complexity of a dozen classical movements under one arc. Gluck's reform of opera involved infinitely less sustaining power, but it ran parallel with the mighty development of the sonata style. The Symphonic Poems of Liszt may be taken as pioneer work in an instrumental style that shall run a similar parallel course with Wagnerian art, but the fruition is not yet there, for Liszt's powers of composition were inchoate and improvisatorial. Anton Bruckner's nine enormous symphonies claim the privilege of importing Wagner's slowest climaxes into the concert-room without any responsibility whatever for their antecedents or consequents; while the immense energy and dimensions of Richard Strauss's musical movement prove indeed that he is the most masterful genius of the present day, but throughout his career have hardly been applied with that unworldly foolishness which at last convinces an uneasy world that it is in the presence of an immortal.

Meanwhile the classical tradition, and something more than tradition, whether classical or romantic, was throughout the latter half of the nineteenth century unfalteringly nourished and revived by two great musicians, a composer of instrumental music and songs, Brahms (1833–1892), and a violinist, Joachim (1831–1907). Among players there were others, especially Clara Schumann (1819–1896) whose own greatness is added to her husband's name; but among

composers Brahms must stand alone by the side of Wagner, not as Haydn stands by the side of Gluck, but as Sebastian Bach might so have stood but for a discrepancy of date. Of course, to say this is at once to label Brahms a reactionary; but the history of the fine arts soon obliterates the distinction between reactionaries and *Vorwärtsmänner*. Sebastian Bach himself was a hardened and cheerful reactionary long before Gluck was a better musician than Handel's cook; but it is his most progressive son who is old-fashioned now. Brahms lived long enough to become fashionable in England for some ten years before his death; some reasons for the fashion were unintelligent, and the same reasons make him rather out of fashion now. This does not alter the fact that his four symphonies, his four concertos, his other orchestral works, his chamber music, his *Deutsches Requiem*, and other choral works are unapproached by anything in their kind since Beethoven; and no musician with any pretensions to a wide range of sympathy with the classics doubts that Brahms belongs to them as no imitator, but as a *maestro di color che sanno*. He is no less perfect an artist in his songs; but time is needed before the musical world can yet agree to do these justice. The special problems of Wagnerian declamation were stated, by Wagner no less than by his disciples, with a one-sidedness that has blinded musical orthodoxy to the nature of lyric as distinguished from dramatic poetry. Hugo Wolf (1860–1903), a song-writer of great genius, applied Wagner's principles to songs with a determination as fierce and instinctive as his peculiar musical inspiration; little justice was done him during his short and ailing life; and Brahms's wider and more complete view of lyric singing is at present supposed to be too narrow to be compatible with justice to Wolf. This is but one more of the thousand matters in which journalism has shrouded music in fumes of literature.

As long as records remain, no English accounts of German musical culture can omit to acknowledge the incalculable debt England owes to the memory of Joachim for

the sixty years in which he paid regular annual visits to England, familiarising us with the noblest and purest interpretations that have ever been heard of the classics of music. His was no virtuoso's repertoire, but the whole history of instrumental music; and his mind was the mind of a great composer. It is not surprising that the one nation which has produced the main bulk of classical music should also produce the greatest interpreters thereof. German players, singers, and conductors owe their eminence to the same qualities history has shown in German composers. It is idle to inquire whether their native talent is equal to that of other races; the most wonderful native talent in the world would be but a part of the force of character which the best type of German musician has always instinctively devoted to the highest purpose of his art.

VII

THE STRENGTH AND WEAKNESS OF GERMAN EDUCATION

By MICHAEL E. SADLER
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I

GERMAN education has long been in many respects an example to Great Britain. Seen in the light of the war, it is also a warning.

It is exacting in its intellectual standards, methodical in purpose, massive in operation. Its strength has lain in ideas, translated by it into action. But its excellence has become one-sided. Its elaborate organisation, triumphantly enforced by the State, has weakened its moral independence. At this great crisis in the history of the world, we feel that its responsible leaders have shown themselves distorted in vision and lacking in right judgment. Inspiring in its origin, illustrious in its history, rich in examples of disinterested service to truth, German education has paid the penalty for going to excess in the use of methods which, if employed in moderation, are salutary and wise. Its long tradition of mental discipline has exposed it to influences which have preyed upon fairness of mind and have perverted intellectual passion into partisanship. Its conception of the claims of the State has led it to neglect the duty of disinterested reflexion by means of which, in the past, German scholars have done signal service to the cause of truth and to the scientific progress of the world. Having overcome, perhaps too completely, certain weaknesses which attend individual effort in the domain of national education, German statesmen and administrators

have failed to guard their country against the even greater danger which arises when the educational system of a people is for the time possessed by the spirit of aggressive ambition, a spirit which, under the guise of patriotism, is but individual self-will writ large.

It is not too much to say that the tone of thought and feeling which, during recent years, has prevailed in German education from the elementary schools to the universities is one cause of the apparent unanimity of the German people in support of the policy of their Government and of their unstinted sacrifice of life and wealth in the present war. National education, organised as it has been in Germany, is an engine of stupendous power for stimulating national emotion and for concentrating it upon duties imposed by the State. German teachers, in spite of a great tradition of intellectual freedom, are administratively subordinate to the Government. By subtle influences, this subordination has encouraged among many leaders of German thought a temper of mind which, in the excitement of desperate struggle, has become passionate, unreasonable, and provocative. In German schools certain methods of instruction have been deliberately and skilfully pursued. These methods have secured a high average of industry and attainment. But these advantages have been won by an excessive attention to the purely intellectual side of school training. It is clear that the over-developed intellectualism of the German schools has failed to secure independence of observation among the pupils, or to deepen insight into the working of the minds of non-German peoples, or to cultivate tolerance towards uncongenial opinions, or to train the power of quickly adjusting the mind to facts previously disregarded or misunderstood. German education, through the excessive employment of certain methods of instruction which are excellent when balanced by other influences, has evidently produced intellectual impressionableness rather than independence of mind.

German education has thus been one cause of the

strength of the war-feeling because it has provided many channels for the diffusion of the ideas of the militarist party. Those ideas have presented themselves to many, especially among the older teachers, under the guise of a duty imposed by the need for national self-preservation. To others they have been attractive because of their appeal to national ambition and because of their defiant assertion of German power. There have been for some little time two currents of feeling among the educated classes in Germany. The one is due to a strong conviction that the treasures of German culture must be guarded against attack from nations which are regarded by German thinkers as comparatively barbarous. The other is due to a rising aggressiveness, especially among younger men, and to a belief that the historic mission of Germany is to educate the world after asserting its irresistible power in the destinies of Europe. This newer spirit is in some of its manifestations impatient with the customary discipline of the German schools. It is restive under its routine, contemptuous of its older ideals, intolerant of its scale of values. Military ambitions have appealed to it because courage has been its chief test of virtue. It believes in valour as the touchstone of character. There is thus a great cleavage in ethical outlook between the young Germany and the old. But the disciplined organisation in which the older intellectual Germany has been entrenched lends itself to the too ready acceptance of these new ideas when they are supported by those in high authority in the State. The result is that there has been much less critical resistance to these new doctrines in Germany than in the freer but less highly-organised educational systems of other countries. German education has too few safety valves. And at the present time militarism is dominant, partly because of the docility of those disciplined by the old educational routine, partly because of the passion for self-development and national self-assertion which is noticeable among many of the younger men.

There is good as well as evil in this new temper of individualism in Germany. It hates shams and hypocrisies. It is willing to try bold experiments. It does not spare itself in its challenge of conventions. But it is exaggerated, unbalanced, extreme. It shows itself, in more sensual temperaments, in self-indulgence and vice; among those who have a marked gift for organisation, in venturesomeness which often leaps into speculation; and in some of the noblest natures, in a high-strung desperate courage. The sensibility of the German temperament has, of late, disclosed itself in this emotion of power. But German education, over-intellectualised in its outlook, and preoccupied with instruction, has not given healthy opportunities for the vent of this emotion or provided quiet personal checks upon its extravagance. This is the point at which, in spite of its admirable qualities, the system of German education has failed in recent years to meet the most urgent needs of the younger generation. It has been inelastic, and has not adjusted itself to the moral and emotional problems which had, for the time, become more pressing than the intellectual.

II

The established system of German education is distinguished by its extraordinary precision of aim, by its high standards of intellectual attainment, by its liberal encouragement of organised scientific research, and by its wide diffusion and convenience of access. In order to understand its present condition, we must look at it in the perspective of history. Its strength lies deeply rooted in the eighteenth century, but what are now its most conspicuous features have been the creation of the nineteenth. From 1806 to about 1840, German education passed through an era of reconstruction, which was inspired by patriotic enthusiasm and by a firm belief in the political value of intellectual achievement. From 1840 to 1870, it went

through an era of consolidation, marked by some reaction from the high-pitched hopes of the earlier period, and also by the growth of realism in educational policy. From 1870 to the present day, its development has been one of the intellectual wonders of the world, a great piece of administrative engineering, deliberately planned, adequately financed, untiringly carried forward to its aim.

The study of German education is made at once more complicated and more interesting by the diverse conditions which prevail in different states of the Empire. Each of the greater German states has made its independent contribution to the educational thought and practice of the whole community. Thus education in Northern Germany has been influenced by that of Saxony, of Bavaria, of Würtemberg, and of Baden. These, in their turn, have been affected by the policy and organising power of Prussia. Nor has the independent action of some of the smaller states like Saxe-Weimar, and of free cities like Hamburg and Bremen, been an insignificant factor in the development of German education. This diversity in unity is characteristic of German social policy, and is especially noticeable in the domain of educational practice. Thus, to speak of the educational system of Germany is, in the strict sense of the words, inaccurate. There is no single code for the regulation of elementary schools throughout the Empire. Attendance at continuation schools is subject to an imperial law of permissive application, or to state laws which differ widely in the various states. The courses of study in the higher schools for girls and (to a less marked degree) the curricula of higher schools for boys, show considerable variety in different parts of Germany. There is no mechanical uniformity in any grade of German education. No central education department in Berlin controls the whole system of German schools. But the German system, while able to adapt itself to local conditions, maintains an impressive uniformity of standards. It is so organised as to secure interchange of educational opportunity and the

reciprocal recognition of educational qualifications. Underlying the whole of it are certain intellectual presuppositions which characterise it among the educational systems of the world. It exerts a united influence upon the thought of other nations. The local varieties which distinguish it do not weaken or obscure the fundamental unity of the whole system.

In certain respects, the educational achievement of Germany has been unequalled in the world. Nowhere else have systematic research and (though with perhaps too much specialisation) scientific method been more diligently applied to educational problems. Nowhere else, except in certain parts of Switzerland, has the tradition of obligatory attendance at school so deeply penetrated the national life. Nowhere else is public and parental opinion so strongly in favour of education. Nowhere else has compulsory schooling been pushed so far into the years of adolescence. The German Government and the leaders of German civic opinion are convinced of the importance of expending State and municipal funds upon the culture of the people, with far-seeing munificence combined with careful economy in administration. In Germany, technological education of all grades is effectively organised in the urban districts, both for the employing class and for workmen. Applied science is skilfully used in public administration. The teaching profession is organised as a branch of the civil service, a plan which has grave defects as well as great advantages. For fully-established teachers in the State schools there is a good system of pensions, as well as liberal provision for sick leave and for the maintenance of the teacher's widow and orphans in their bereavement. Secondary education, especially for boys, is widely diffused, at low fees and with high intellectual standards, though the attendance at these schools has been greatly increased by the desire to obtain certain privileges in military status, and not solely by a zeal for education for its own sake.

Every grade of British education from the kindergarten

to the university has been influenced by German example and by German investigation. Froebel's writings, and the work of Froebel's disciples, brought a new spirit into the methods of training little children in infant schools and in nursery classes. Our courses of professional training for teachers are indebted to the writings of Herbart, Wiese, Schmidt, Wilhelm Rein, Wilhelm Münch, Natorp, and of many German writers on psychology. Our school hygiene and the medical inspection of school children are under obligation to the stimulus of German example. The recent advances in continuation schools have been helped by the successful experience of Dr. Kerschensteiner of Munich. The more effective organisation of courses of study in State-aided secondary schools is in part traceable to British study of German experience. The encouragement of higher technological education of university rank is, to a great degree, the direct result of German example. But the crucial difference between the history of German education and that of English during the nineteenth century (the remark is less true of the Scottish) lies in the different use which the two countries have made of the power of the State. In Germany that power has been exerted unflinchingly and without any serious resistance from public opinion. In England the power of the State has been used reluctantly and has met with opposition at every stage. Without serious misgiving, Germany adopted the principle that the control of national education is a function of the central state. England (and, in a measure, Scotland) hesitated between two opposing theories, namely, the theory of State control and the theory of group autonomy under the general supervision of the State. Germany came to a decisive conclusion on this fundamental question of procedure. Great Britain (and particularly England) remained divided in conviction about it and therefore irresolute in policy. Germany standardised her education upon a system. Britain, distrustful of State control, compromised. Hence, Britain was dilatory while Germany was prompt. Britain

temporised, because she was feeling her way by instinct to some new adjustment of the claims of the State and of the various social groups of which the State consists. Germany cast in her lot with a consistent theory and acted vigorously in accordance with it.

But the failure of England (and, in a less degree, of Scotland) to work out a consistent plan of State control in education is part of the price, perhaps the chief part of the price, paid by her for an administrative freedom which, in other fields of effort, has enabled her to render unrivalled service to social progress and to the economic development of the world. The struggle of educational ideals in England during the nineteenth century was but one symptom of a social struggle between almost equal forces in the national life. In the course of that long contest, in which Scotsmen resident in England bore their part, nearly all of the social groups which constitute our nation formed the habit of self-reliance and acquired experience of independent action. They learned to refrain from political interference with the self-governing British communities in the Dominions beyond the seas. They learned the lesson of religious toleration. They granted freedom of self-organisation to artisans. They accustomed themselves to hearing both sides of the argument on all the great questions of public policy and of national organisation. They passed through revolutionary crises without civil war. They combined new ideas and old traditions with a fertility of resource and with a degree of mutual consideration unmatched elsewhere.

III

During the last few months, the sinister side of State control in German education has been revealed to the world, and not least to thoughtful observers in the United States. President Murray Butler of Columbia University, who has been active in establishing intimate relations between the German and American universities, has recently shown his

disillusionment with some of the results of German education, and his deepened appreciation of the British view that the supreme outcome of educational training is right judgment, combined with disinterested uprightness of character.

A still more penetrating analysis of the failure of German education to hold the mind steady against chauvinism and against over-weening national ambitions has been made by M. de Lapradelle, Professor of the University of Paris and General Secretary of the French Society of International Law. In an article published in America in November, M. de Lapradelle said that since 1870 Germany has been led into an excessive assumption of intellectual supremacy. Modern Germans, in his judgment, are very diligent observers and careful students; attach vast importance to detail; love to catalogue, and catalogue almost with genius. But the near-sightedness which arises from intense study of a small part of a subject is apt to produce in them an aggravated narrowness of vision. Narrow vision in turn may eventuate in selfishness. The Germans have become selfish after this fashion. Germany's political philosophy forms the basis of her educational system, and therefore the basis of her social system. It cannot be denied, M. de Lapradelle writes, that German education, as well as her politics and militarism, directly pointed to this great conflict. The glorification of the State has included of necessity the sacrifice of the individual, and this has been conducted ruthlessly in Germany.

An even better-equipped observer, Mr. George Saunders, for many years the correspondent at Berlin, first of the *Morning Post* and afterwards of *The Times*, summed up, in 1901, his experience of the contrast between the German and the English mind as follows: "I find that the intellectual apprehension of the average educated German is at least, on a rough computation, ten times quicker than that of the average educated Englishman. On the other hand, in nine cases out of ten, I find the German's intellectual judgment most uncertain and weak, and often most con-

ventional. In ordinary matters of judgment, it usually turns out that the Englishman has, perhaps unconsciously, been taking a much wider basis for his induction than the German has. The German is so persistently taught the value of specialisation that he adopts a spurious kind of it in his ordinary judgments, and limits his field of vision quite unnecessarily. He is taught at school to form judgments on the strength of the facts submitted to him, and not to distrust their adequacy. Hence, gifted Germans with international experience often contrast the hesitancy and care with which an educated Englishman expresses his view on any subject with the eagerness and rashness manifested by the majority of educated Germans in talking about it."

A similar view was expressed by the great biologist, Dr. Virchow, at the great conference on higher education which was held, at the instance of the Prussian Government, in Berlin in December, 1890. "I regret," he said, "that I cannot bear my testimony to our having made any progress in forming the character of the pupils in our schools. When I look back over the forty years during which I have been professor and examiner, a period during which I have been brought in contact not only with physicians and scientific investigators, but also with many other types of men, I cannot say that I have the impression that we have made material advance in training up men with strength of character. On the contrary, I feel that we are on a downward path. The number of 'characters' becomes smaller, and this is connected with the shrinkage in private and individual work done during the lad's school life. For it is only by means of independent work that the pupil learns to hold his own against external difficulties and to find in his own strength, in his own nature, in his own being, the means of resisting such difficulties and prevailing over them."

Another careful observer, Professor Wetekamp,[1] laments

[1] In his work *Selbstbetätigung und Schaffensfreude in Erziehung und Unterricht* (Teubner, Leipzig, 1910).

the failure of the modern German school to train its pupils by self-activity to independent work. German higher education, he contends, concentrates itself too exclusively on the intellectual side. By its methods of instruction it over-develops the receptivity of the pupil's mind and does not train the power of original production. Its intellectual standard, as fixed by the leaving examinations, is so high that in order to attain it the pupil is helped too much by skilful teaching and hurried too much in his private studies.

Before the war, there were many signs of uneasiness among thoughtful Germans at some results of their educational system. They felt that the German higher schools were excessive in their intellectual demands and paid too little attention to self-direction and independence among the pupils. It is significant that the confidential "Memorandum on the German Foreign School System," which was issued to the Budget Commission of the Reichstag in 1914, and analysed by Sir Edward Cook in the *Morning Post* of November 4 last, states that "Germans resident in England value English education so highly that they nearly all send their children to English schools."

In Germany, the masses of the people have had little to do with determining the course of educational policy. The keys of the position are in the hands of a strong central authority, which works through a highly expert Civil Service, including the teachers in its ranks. In spite of the fact that there is no Imperial Minister of Education in Berlin, German secondary and university education are nevertheless a coherent whole and are influenced by similar presuppositions. The most competent German observers have long admitted that, though the British (and especially the English) system of instruction is far behind the German, the German system of training is far behind the English in its effects on character. The tendency of the German system is to produce a very large number of boys possessing a high level of attainment in a wide range of subjects, to ground them excellently, and to leave them highly dis-

ciplined and quick to learn, especially when under instruction. On the other hand, the tendency of the British system is to give more scope to individual talent and, at the cost of much intellectual wastage, to produce a comparatively small number of first-rate minds keenly interested in their favourite subjects, accustomed to rely a great deal on themselves, and keen to pursue their studies to a higher point.

The German system of education is collectivist in its tendency. It has the strength and merits of collectivism. Its forces can be easily mobilised. Its different parts are standardised to a convenient pattern. It lends itself to effective co-operation in large developments of industry and commerce, as well as to concerted labour in research. It is prodigiously strong as an engine for conserving the intellectual capacity of the nation and for directing it to an appointed end. Its organisation, which has permitted its rapid and economical development, has made the educational system of Germany a weapon in the hands of the dominant power in the State. It has made the minds of individuals too susceptible to current intellectual fashions and has left them deficient in the power of independent criticism and of resistance to governmental control.

During the years immediately preceding the war, many German and British teachers were feeling their way to educational reforms in their respective countries which would, to some extent, have corrected the defects of each system by engrafting upon it many of the excellent qualities of the other. There is no doubt that German education and British have each much to gain from a study of the other's merits and from avoidance of the other's defects. But the two systems are deeply rooted in national history. It is doubtful whether the finest qualities of the one can be combined with the finest qualities of the other. It may be predicted, however, that, as a result of the war, the character-forming influences in British education will be imitated in Germany, and that, on the other hand, German

zeal in encouraging research and technological training will receive closer attention from the British Government.

IV

From our experience of German education we may draw lessons for the guidance of educational policy in Great Britain. If we are prudent, we shall avoid an excess of bureaucratic control. We shall frankly recognise the value of official experience and of the guidance and prestige which the resources of Government enable it to give to educational effort. But we shall avoid that system of administrative law which withdraws the official from the ordinary courts and places him under a special code. This arrangement is convenient for administrative discipline and on other grounds, but is injurious because it segregates the official world from the non-official population. We shall also guard ourselves against setting too much store by administrative tidiness in our educational system. We shall remind ourselves that, in the difficult days of social readjustment which will follow the war, there will be more need than ever for variety of experiment, for variety of educational tradition, for variety of responsible initiative. The most valuable things in our British education depend on encouragement being given to each school to have a personality of its own. But to have a personality, a school must have (so far as a reasonable degree of public order allows) freedom of growth and self-direction in its purpose. For this freedom a price has to be paid. The price is a certain untidiness in organisation, an overlapping of effort, and much waste of intellectual energy. This is a heavy price to pay, but it is worth paying. Freedom from the iron band of State control allows teachers and pupils the training in individual responsibility which develops and fortifies character. And the highest kind of freedom, though indocile to external pressure, realises itself in willing subordination to the common good.

In the future development of our educational policy it will be prudent to respect local opinion, even when it is stubborn; to elicit and to respect the convictions of parents; and, above all, to respect the individual conscience. Education touches problems on which conscience is sensitive. And national education is noblest when it is inspired by a variety of earnest social ideals and kindled by a desire for justice and for honourable dealing between man and man and between nation and nation. But the healthy growth of this spirit in education involves opportunity for variety of judgment upon some of the most controversial questions. It presupposes, also, a reasonable degree of freedom of utterance on the part of the teachers. This is very difficult to combine with State control. But just as education cannot dispense with a due measure of aid and superintendence from the State, so also the State cannot in the long run dispense with the moral independence of character formed among its citizens by the influences of a morally free education. Some of the advantages of administrative economy and precision may therefore be wisely foregone by the State in order to secure the greater benefit of a general readiness to bear moral responsibility in judgment and in action. The most indispensable service which education can render to a people is secured not by administrative machinery but by spiritual influence. This influence is quickened in the conscience, is shed by personal example, is fostered by great traditions, and is deepened by wise instruction, by self-training, and by the experience of later life. It is an influence which keeps the heart and the mind (not the mind only, but the heart also) in knowledge, and not in knowledge only but in love.

VIII

POLITICAL AND ECONOMIC ASPECTS OF GERMAN NATIONALISM

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I

The war has turned our attention to the methods and purposes of an ideal which is broadly defined as nationalism. It might seem that, so far as Germany is concerned, we in England need consider only the manifestation of this spirit in the outward activity of that country, its *Weltpolitik*. We have, in fact, become interested in more than that—in the idea of the German State at home, as this is affected by the same policy of nationalism. We have even claimed that the result of the war must be, not only to defeat the militarism of Prussia as a weapon of world-power, but also to free the German people from the dominance they are said to live under. The whole thing has come up for consideration in all its aspects. We are placed in a dilemma by our long admiration and imitation of certain aspects of German organisation. We find that there is a philosophy of nationalism for Germany which is fairly consistent in its economic and political teachings, and gathers round the main idea that the State is Power. This has checked our admiration for her culture, and eminent men have begun to urge that her science, philosophy, and organisation have been greatly over-rated. The war will end, and we must find a *modus vivendi* again, and much of this new criticism of German culture will subside. We must seek to understand the ferment of German thought which has produced this

clash of arms, if only that the settlement may be a peace. But there will also be the gain that thereby we shall be able to understand even our own position better. For some of the main ideas of German nationalism have been taught in this country. They have been food for us, even if they have become poison for her. We have been and are Pan-British as they have become Pan-German. Their philosophy of the question is more reasoned, because they came late into some fields of activity and have had to strive for things to which we more easily fell heirs. It is a union of economic and political tendencies, the fruition of both being in the *Weltpolitik*. The defeat of the latter must react on much of the organisation of which it has been regarded as the full expression. More than seventy years ago List drew up a programme for Germany, the main ideas of which still govern her economic policy; but this programme is incomplete, and the other efforts at organisation fail of their chief purpose, if the politics cannot supplement the economics. Power, he said, must be the economic aim of the nation; and the great historian, Treitschke, clinched it from the political side by the same ideal of Power. Whatever this may now have become, it was not in its origin materialistic. On the contrary, List believed that he was leading a reaction against the materialism of Adam Smith. And to Treitschke also the idea that the State must be mighty was not the idea that might is right. As to both home and foreign politics he rejects this. But the teaching of masters reaches the forum in the form of phrases and maxims, and "the State is Power" is a dangerous maxim out of their hands. When we understand the full content of List's maxim we shall know whether this war is against German "culture" or if it is against a degraded use of his teaching; or if it is simply a clash of ideals and arms.

War itself, the occasion of its outbreak, the incidents of preliminary negotiation, and the methods by which it is waged, necessarily bias the judgment on all the forces which

have long been preparing it. The rights of small nations have come across the direct issue between England and Germany. But we get out of this particular confusion, so disastrous to any patient attempt to understand Germany's true historical position, by turning to such a study of the larger issues as has been presented in Professor Cramb's *Germany and England*. Here is a generous estimate of the ambitions to which the nation has been led by great teachers; and the moral is that war, somehow and sometime, was the fated outcome of the growth in Germany of a national ideal in which we had preceded her. Speaking early in 1913, he could "see no issue to the present collision of ideals but a tragic issue. . . . If Germany has not declined from her ancient valour, the issue is certain and speedy. It is war." And it will, he concludes, be simply a war of ideals, justly held on both sides. A nation which has made good, and wishes to write a political science of internationalism and peace, must reckon with the newcomer into a limited world. But this is an *impasse*. If colonial empire *matters* to full nationality (and this is implied), then it would not be right for Germany to lay aside her ambitions, whatever the outcome of a war. The result is not war but wars. "Friendly rivalry," he puts aside as a mere phrase not suited to this sphere of discussion. Then what follows? The "right" and even the "duty" to make war are advocated by Bernhardi, and this we call militarism. The best we can get out of it is Treitschke's belief that wars will be fewer and intenser; just the development in foreign politics which will correspond to the prevailing view on strikes at home. But war will take a new place in the writing of political science. Professor Cramb even thinks there will be a struggle of religious ideals. All this because he concedes main facts in the policy and study of nationalism.

This conflict arises because nationalism has developed in each nation similar ideals of the final purposes of the State. Can it be avoided by any tenable philosophy of distinct

national ideals? A favourite doctrine of List, for example, is the relativity of State policy, but he uses it only with reference to the *stage in time* which any nation has reached. Should the aims of nations not also be relative to different kinds of genius? The struggle to survive between nations would then be modified by a kind of selection that is different from "natural selection." Professor James Ward has shown how, even in the biological sphere, natural selection is mitigated by "subjective" selection, since different organisms seek their subsistence in diverse ways, and do not all compete for the same means of livelihood. If pheasants are interested in mangolds, fly-catchers are not. Areas of strife may overlap, but they do not coincide. Is it possible that ideals of national prestige and power may thus seek their expression along different lines? This has been suggested as a result of the war. Let the genius of Germany continue to make its impress on the world in art, in the patience and fullness of scientific research, in technical discovery, in such conceptions of organisation as are shown in her much-studied Poor-Law system, the industrial discipline of Cartels, the fine arrangement of her great cities. Let England make her special contribution in the sphere of colonisation and government. The lines of progress will cease to be competitive and will fall along the traditional paths of each country's advance. Now, in the first place, we are not in a position seriously to propose this solution. We are not willing to abate the energy with which we have pursued Germany in any of her special activities. We subsidise technical science, and intend to overtake her in that race as soon as we can; we study her organisations in order to profit by them. How if she does the same in our particular field of world politics, sea-power, and colonisation? But, in the second place, it is a mere fact that no such idea would be entertained in a nation of the size and influence of Germany. The *Weltpolitik* is the crown of other national organisation, its fullest expression and greatest opportunity. As we shall see,

even in England, it has been held that there is a profound reaction of such external striving on the vigour of other ideals and the faith with which they are worked out at home.

There is, in fact, something in the life of great nations that is analogous to the missionary activity of a Church. I have heard the head of a great missionary organisation explain how the efforts of the Church in foreign places were quite essential to the fullness of its life at home; that a Church which had not the missionary idea would lose faith in its principles and ideals; that this reaction was so fundamental that missions must be regarded not as an addition to, but as an integral part of, organised religious life. This is precisely the spirit in which the colonial question was approached by Treitschke. Nationality cannot impress itself through emigrants who lose their nationality. Professor Cramb speaks of it as the endeavour of England in her colonial policy "to give all men within its bounds an English mind." Even in industrial affairs it is often found how there comes a time in the growth of a business when a man who has seen it grow will continue, long after profit has ceased to be a main motive, to devote himself to its development, because it has become almost his personality. The force of this missionary idea has been felt in Germany, which has no adequate colonial outlet, much more than in France, which has a much greater outlet. That is one reason why the Germano-British antagonism is the engrossing feature of the present war.

Of course, we may say that a nation must realise accomplished facts; that "the true enemies of Germany are history and geography." She has come late into this field, and the New World is limited. There is a command against covetousness. But history is not a closed record, nor an impersonal force. Men and nations will continue to make history for centuries to come. And so, say the Germans, "we give the past to England." But how many forms of possible development in the long future would be barred if Germany now gave up the imperial idea?

It is not in this, but in another sense, that history is against Germany. The world cannot be put back to the position as it was when European colonisation began, and Germany was too much occupied with contests nearer home. A great part of the work of colonisation is done, not in the geographical sense, that the space is occupied, but in the human sense, that order exists, there is developed trade, barbarism and savagery are rooted out. This is done, the honour has been won, and the pride and prestige are founded in the honour. It is possible for another nation, if it has the force of arms, to obtain now the pride of colonies, but not the same honour. The New World is now old enough for many colonial institutions to be studied and imitated by the mother country. It will soon be impossible, if it is not so already, to speak of colonisation at all in the original sense of the word. And to this, therefore, Germany has but one answer: "Let us make haste." The Empire has an "hour of destiny."

And it is not only from the point of view of colonial occupation that "the hour" had to come soon, if it were not to be missed. There is the influence, on the less developed nations, of the prestige and influence of European Powers to be reckoned. Western art, literature, and civic organisation will not impress them so immediately as will language, commerce, sea-power, and the flag. Towards whom will China lean as she is unwillingly dragged into the nexus of world-politics? The English language is taught in her schools and colleges. A little longer, and the East will have "set," if not toward England herself, at any rate toward English-speaking peoples. Except in South America, English is becoming the language of commerce and international intercourse. Germany has to contend in respect of this penetrative influence not only with the British Empire, but also with the United States. If there is time, there is no more than time, to work against this powerful tendency.

There have long been philosophies of the State, the basis

of rights and duties, the final sanctions of law. What now appears is an applied philosophy, relative in its point of view, tending to nationalise political science, just as religion is sometimes nationalised in churches. In economics and politics, science is always liable to lean over into policy. It may be called "theoretical" if it does not, the opposite being "propagandist" rather than "practical." What are called the "exact" sciences are not under this tension. One feels, in the exposition of nationalism, an adaptation of science to policy, and yet it is written as science. A fundamental idea is the relativity, not the universality, of truth as to national duties and claims. Though excursions are made into the universal statement now and then, that is rather to strengthen and sanction an opinion, and the real question is, not as to States and their bases, but as to principles and policies for States in Europe at the opening of the twentieth century. It is for that reason that the quasi-scientific study of states leads to *impasse*. A demonstration is made, for example, by an English authority of the influence on nationality of colonial enterprise; the reasoning is taken up in Germany, but this attempt to extend it defeats it. Mr. Angell shows up the same dilemma in regard to armaments. In some cases, such as List, there is an escape from the conclusions, because they hold in reserve an opinion that the whole thing is provisional, pending the achievement of internationalism or federation, which is the final ideal, and will give a true and consistent science. But Treitschke will not have, even as an ideal, this pooling of the special gifts and aims of nations. The State must be sovereign, and trustee for certain forms of culture, which it must not debase or reduce to an average. Naturally, therefore, from such an *impasse* as Professor Cramb leads up to, there emerges the philosophy of war, and the future is entrusted to opportunism, personality, and catastrophe. And if war, like the strike, is put in the place of arbiter, there may be, in one case as in the other, an exposition of more thorough methods of carrying it on.

The last questions in politics and economics will not be solved politically or economically; it will depend on education and the reality, in its widest meaning, of religion.

In the philosophy that is presented to-day there are two main elements—a political and an economic. These reinforce each other. List starts in economics, and is carried on to a wide political policy; Treitschke has political aims before him in the first instance. It will make at any rate for understanding of their results if we examine their teaching in the light of what has been said in this country on the same question.

II

Let us consider world-politics first. The book which did most in recent times to awaken England to the Pan-British or imperialist idea was Seeley's *Expansion of England*. Many of the fundamental positions of Treitschke are to be found in Seeley's work. He has even a good word for the Prussianising of Germany. "Now," he asks, "after a hundred and fifty years, what political experiment of the eighteenth century can be named which has been so strikingly successful?" His philosophy of States and colonial empires has remarkable similarities to that which was being propounded by the great German historian. His political arguments for colonies are similar to Treitschke's, and his bias for large nations is as evident. He feared that England was losing hold of a point of view which Treitschke was urging Germany to realise.

We must read the history of England, Seeley urges, not merely with a student's interest, but "in order to set us thinking about the future, and divining the destiny that is reserved for us." And we must consider the fate of the nations which have lost their old rank. "Some countries, such as Holland and Sweden, might pardonably regard their history as in a manner wound up. They were once great, but the conditions of their greatness have passed

away. . . . The only practical lesson of their history is a lesson of resignation." But, though bigness is not everything, the great fact of British history has been the foundation of Greater Britain, or the "English Exodus." This tendency has been "profound, persistent, *necessary to the national life.*" We must hold to its results if we are not to "expose our trade to wholly new risks," if we are to remain in the "first rank of States, and in a higher rank than the States of the Continent." Those nations which have in turn obtained maritime power, and come in contact with the New World, have grown to greater strength in arts, industry, and letters by the reaction on home life of the "civilising sea." Italy, Venice, Holland, and England are quoted to show how nations are unified and organised when they enter on the maritime stage. It is the struggle for the New World which "more than anything else has placed these nations, where they never were before, in the van of intellectual progress, and especially it is by her success in this field that our own country has acquired her peculiar greatness." The most recent inventions in transport and communication have rendered even closer political unions possible; while these same inventions "tend to make States which are on the old scale of magnitude"—mark the adjectives—"unsafe, insignificant, second-rate." And, finally, it is not absolute, but relative magnitude which counts. So that he leads us up to a final question, aimed at making this nation care to hold what has been won, because the holding of it under the flag is more vital now than it was before. "We often hear abstract panegyrics on the happiness of small States. But a small State among small States is one thing, and a small State among large States quite another. . . . If it be true that a larger type of State than any hitherto known is springing up in the world, *is not this a serious consideration for those States which rise only to the old level of magnitude?*" In half a century "Russia and the United States will surpass in power the States now called great. . . . Is not this a serious

consideration, and is it not especially so for a State like England, which has the choice between two courses of action, one of which may set it in that future age on a level with the greatest of these great States of the future, while the other will *reduce it to the level of a purely European Power* looking back, as Spain does now, to the great days when she pretended to be a world-state." It is needless to emphasize the moral of this reasoning. Amid the expansion of other empires, Germany has given an affirmative answer to the question—"if this is not a serious consideration." We may not agree with the reasoning, but it was meant to and did influence British thought, and is not far apart from that which, with different elaboration of detail, but the same outlook on world-conditions, was setting the idea of expansion before Germany, as an integral element of what Seeley called the "significance" or "first-rateness" of a modern State. Great as the Empire was in 1884, when this argument was set forth, we have done even more since then than he was disposed to urge. France, even with a declining population, has made herself the second colonial Power. And it is to this, as yet, purely political ideal of significance and prestige that expression is given by Treitschke. "All great nations, when they become strong, have felt the desire to impress the seal of their culture on barbaric lands. . . . The nation which does not take a share in this great rivalry will play a pitiful part at some later time. It is a *vital* question now for a great nation to show a desire for colonies."

A parallel might indeed be drawn here between the international problem thus created and the social problem at home. The latter arises out of the inequality with which the means of life are distributed. It is felt that the means of life should be subject to some principle of a minimum of distribution to all citizens; because they are vital to life. It will be seen that the tenor of such argument as Seeley and Treitschke have put forward is that great nations too have, among the vital necessities of continued greatness, this

outward attitude toward the New World. But the means are limited internationally, as they are not limited socially. There is a remedy in the latter case by the growth in the sum total of wealth. So there is an acute "social problem" for nations if these colonial theories are true. Within States, the distribution problem becomes more urgent as knowledge of facts and possibilities grows; and so, between States, a time came when Germany, hitherto involved in even more urgent questions of European politics, became aware of other nations' privileges, and claimed a share in this new wealth. The analogy might be carried a little further. Next to not having a full share in new wealth, there is in the social agitation a bitterness arising from the feeling that some people go on creating it to the increasing advantage of others; the nexus of the economic system brings this about. So with the strength of a nation which emigrates to colonise for another State. Seeley describes it as "a strange question" to ask why we need have colonies "of our own." "How much of our most valuable energies," says Treitschke, "have we lost through emigration, and are still losing, without obtaining the slightest compensation." A kind of "surplus value" goes to another nation, if this theory of colonies is accepted.

English people have become accustomed to a certain idea of the map of the world, and it is not easy to realise the outlook of Germany on the results of our expansion. And in a national song on this "land of hope and glory" the wish of its people is that "wider still and wider may thy bounds be set." If we had this song, with only a few not very habitable colonies! That is how Germans sing "Deutschland über Alles." We have not only to make a settlement after the war, but to make *peace*. And for that purpose we must at least understand the fact that the new wine of Imperialism has got into the old bottle of a European frontier. Anyone who has seen how our flag and language dominate the highways of the world must mingle his pride with wonder at this singular development.

Seeley speaks of the "civilising sea," meaning to say that nations which have obtained great maritime power are thereby braced in all aspects of their home life and energy. "England owes its modern character and its peculiar greatness from the outset to the New World." The "intellectual stimulus" which the sea gave to the Low Countries made Holland "take the lead in scholarship and in commerce." They owed to it the work of Scaliger and Descartes as well as of Van Tromp. Treitschke takes the same view, and explains by it that undefined instinct which at all times has attracted nations to seek a future on the ocean. Indeed, in the work of both List and Treitschke there are phrases which almost imply that it is worth while to have colonies just in order that, or because, there must be a navy to protect them, and a mercantile marine will grow out of this relation. There is a prestige in sea-power that is due perhaps to an unconscious application of Seeley's favourite word "significance." A great ship is the finest thing we make. It might leave us cold to know that another nation possessed more than half of, say, the glass-bottle industry of the world. It would not leave us cold if we had to accept the same result as regards the mercantile marine. Our shipping is an activity which obtrudes itself on the view of the whole world, as other industries do not; it is an obvious outgoing of our energy, something that is not shown only in statistics. It belongs to our "significance." It is another aspect of the same tendency that nations think so much of their export trade in reckoning their international position.

III

The economic aspects of nationalism in Germany bring us specially into contact with the great name of Friedrich List, the author of a tendency which has prevailed in that country toward a relative, an historical, and in consequence a social view of economic development. Early in the

nineteenth century a so-called "classical school" existed in Germany, and the influence of Adam Smith's ideas of the "natural system" was considerable. Few books have been more misunderstood than the *Wealth of Nations* because few people have read it through. The great bulk of the inductive and historical work which the author did sinks out of sight, and a few passages on the "natural system" of trade are remembered, exaggerated, and taken out of their historical context. It was a cruel question which was put in a school examination paper, which asked the pupils to "Tell all you know about King Alfred, omitting the story of the burnt cakes"; and it would equally embarrass many people who quote him were they asked to tell all they know of Adam Smith, omitting the question of *laissez faire* (a phrase which he does not use). There has also been the reaction from writers of greater abstractness, such as Bastiat, and Smith has had some of the general blame put upon him, just because he was the great name among all those of his time. His influence reached Germany both directly and indirectly, not only affecting some professional teachers, but enforcing the idealist habits of thought which prevailed in the eighteenth century. Von Thunen and Lorenz Stein are the most important names, and "the school" against which List directed his attack included journalists and popular writers to whom the clean-cut idea of the "natural system" commended itself. The tendency of this teaching, and of Smith's critique of systems of restriction, at any rate in the partial and often derived form in which it reached Germany, was toward cosmopolitan or "international" ideals of economic activity. A pure individualism will lead to this kind of internationalism, since the producer will consider only the most profitable outlet for labour and capital. Though there are abundant corrections of this in the *Wealth of Nations*, and the "natural system" has in that book in any case a limited sphere (the investment of capital and sale of labour), still it is an idea which, once it is taken

hold of, has great momentum of its own, and it was to this momentum that the extremer developments were due. It is evident that List himself had either read Smith hurriedly and partially, or was opposing the pupils rather than the master, or, as he suggests in his own book, was deliberately exaggerating for the sake of a clearer issue. He was not an economic teacher; but in his troubled and wandering life he had read, as he claimed, "the book of actual life." And the force with which he wrote the *National System of Political Economy* made him both the founder of German protection and the forerunner of the "historical school" which has since been prevalent. Knies, Roscher, Schmoller, and the "Socialists of the Chair" continued the development. The question is one of emphasis; the history of organisation cannot be identified with the science of organisation, and there is as much theory in the writings of the eminent leaders of German economic thought as there was of historical study in Adam Smith.

It is plain that a historical bias will lead to a *relative* view of economic policy. Nations are at different economic stages, and have followed different lines of evolution, the economic and political conditions reacting on each other. By showing up this relativity, the historical method tends naturally to emphasize the need for independent policies, so that each nation may provide for its own economic development according to its stage of political and economic growth. This is not, in fact, a study of economics but of economic policy; or of the right application of economic cause and effect in view of the whole requirements of national life. Economic science is drawn into public controversy as most sciences are not; and the science is made to appear relative and provisional when in fact it is to the policy that these words apply. The geology of Germany is different from that of England, but geological science is not on that account relative and provisional; though the problem of locating and using coal-measures would be relative to the different geological facts. The

whole of the discussion which the historical school has raised must be considered, not only in the light of the contrast of policy and science in economic affairs, but also in view of another distinction which has had to be made plain. An historical school will be predominantly a fact-school; a collector and classifier of material, and suspicious of pure deduction. The modern German scientific mind loves to move in these regions of research. And it tends to emphasize a distinction which ought not to be a cause of strife, but ought to remain as a distinction only, that which exists between thought-books and fact-books. Neither can get on without the other; and the division of labour is a question of temperament, whether individual or national.

The effect of the historical method on Germany's contribution to modern economics has been variously estimated. The Italian Cossa, in his review of schools and tendencies, held that the German school had "gone off at a tangent, denied the existence of general laws, led young men out of the way of theoretical investigation, turned every one of them to the study of history or politics," and thus it "stands convicted of a narrowness of view not less flagrant than that of the French optimistic school." The Germans, he elsewhere says, "encourage each other in the hope of exorcising political economy, by riveting their eyes upon historical minutiæ." It is true that the historical or descriptive monograph is the special contribution of Germany, and that this can run to seed in mere detail. But the German professors have not limited their outlook to Germany; they have taken the whole world for their province, and produced numerous valuable studies in British, Russian, and American development. Professor Hasbach, the historian of the English agricultural labourer, has made the claim that to Germany has fallen "the lion's share of all the research in economic history." And we owe to this organised force of investigators such great international works as Conrad's *Dictionary* and Schönberg's *Text-book*. The danger is that this method of study, undertaken in

reaction against dogma, will itself create a dogma, since facts can be viewed with an historical, as well as with a theoretical prejudice. Economics is so closely related to questions of public policy and social reform that many people, who have not the faculty of analysis, will still desire to work in the field, and give themselves to descriptive or historical work; and so we get the fact-books, of which the thought-books must constantly take account, but whose sequences and classifications must stand analysis and cannot usurp its place. If one may judge by such a writer as Professor Cohn, a member of the Eisenach Congress of 1872, the last forty years have lessened the opposition of German schools. In 1873, in the controversy against *Manchestertum* in Germany, he wrote that no principle of, for example, banking could be set up until all the facts about banking in every country where banking exists had been collected; and that the same labour must be gone through in every other economic field; so that a complete compendium of all facts preceded the study of principles. By this test, no science could have principles. But, thirty years later, the same writer has come to the more moderate position that, while the historical standpoint has great merits, it no longer stands in real opposition to deductive or theoretical science. The cultivation of the historical tendency in political economy "only serves to bring the importance of logical method into stronger relief. We can dispense with more or less unreliable accumulations of facts—never with thought or clearness of thinking." And the German "schools" are, in his view, now becoming less defined, as initiative becomes too strong for tradition.

The historical school would tend toward nationalist ideas of trade policy, because of the perception of stages of growth. This is a fundamental position with List. But also, in the internal affairs of the nation, it would reinforce proposals for the action of the State. The study of past changes raises questions of right and wrong, as the static analysis of systems cannot so saliently do. The problems of land

and labour are everywhere affected by the merits of certain historical transitions. It was not unnatural that the historical methods of the newer German economic teachers should commend themselves to that group who, after the Eisenach Congress of 1872, became known as the "Socialists of the Chair."[1] Problems which are shown to involve redress, restoration, and compensation lead, since the past cannot be called to account, to claims on the nation and the action of the State. So that the historical school has fostered a nationalism in public policy which works toward both the economic unity of the nation at home, and its self-conservation in outward relations.

Born in 1789, List became in 1819 the president and adviser of a league of German manufacturers who saw ruin to their industry in the removal of the blockade, and the coming inrush of British goods. But it was especially the growth of American industry which impressed him, and turned him from the teachings of "the school." From 1841 to 1844, after his travels, he published the system which "is not based on a bottomless cosmopolitanism, but on the nature of things, on the teaching of history, and the needs of nations." The special feature of this system is to be nationality. The individual does not serve mankind best by looking after his own interest, and depending on "economic harmonies"; nor yet by cosmopolitan views of human brotherhood which are only feasible in a long-distant commonwealth of Europe. The unit of active service is the State. List has no theory of the basis of the State. It is just the group of people who are organised under one government. In the times we have to deal with, indeed, the ancient bases of race and religion have not the same authority, since races overlap nations; nationalism can get on with common interest, sanctified by the secondary religious force of tradition, mainly created by wars. List's is the most reasoned and complete philosophy of nationalism

[1] Or "Academic Socialists," as their Association is not limited to University teachers.

in its economico-political aspects; and it is from the economic basis that he believes the more intellectual and moral energies arise. Seventy years ago, with great literary skill and freshness, he gave Germany a programme.

The rise of the early German "classical school," and the influence of Adam Smith, he explains by reference to the whole mental atmosphere of the time of Kant. In Germany mental culture preceded, while in other nations it followed, the growth of material interests and powers. He did not want Germany to have the fame of a professorial nation. "The whole culture of Germany at present (1841) is theoretical. Hence those numerous unpractical and strange characteristics which other nations observe in us. Hence the German attachment to philosophic systems and cosmopolitan dreams. The intellect, not allowed to move among the facts of the world, strove to exercise itself in the fields of speculation."[1] And in another place he has given a still more emphatic opinion on the view that world-power can be exercised by the culture of the "humanities" alone. "It is possible for a nation to have too many philosophers, philologers, and men of letters, and too few skilled workmen, merchants, and sailors. This is what results from a highly advanced and profound culture, which is not balanced by a highly advanced manufacturing power, and by great internal and foreign trade." The surplus of such a nation is "a mass of useless books, subtle theoretical systems, and learned arguments, which do more to darken than to cultivate the mind of a nation, and withdraw it from useful occupations." This reaction against the idealism of the eighteenth century had taken place in other fields of German thought, in jurisprudence with such men as Savigny, and in social philosophy the organic ideal of Fichte went beyond the individualism of Kant.

And yet some parts of his own argument are æsthetic in their statement, when he explains the harmony of a many-sided national development. And the general tenor

[1] The quotations are from Lloyd's translation.

of his reasoning cannot be called materialistic, for the spiritual results of material development are one of his main contentions. The State is the unit of the world's progress; its activity cannot be based on an "absolute" philosophy; relativism and the historical spirit are essential. The summary of the policy which will make a "great, mighty, and rich" nation, is given as "native manufactures, free internal intercourse, foreign trade, navigation, and naval power." Material in its terms, this is also the policy which will put a healthy strain on the national fibre, call out the patriotic imagination, create organised effort and loyalty, and improve to the highest the moral and spiritual outlook of the people. In the *Politics*, published in 1844, he associates colonies with sea-power as part of the ideal, and claims Holland and Denmark for Germany.

The argument is forcibly expressed, and in one point there is an important difference from the later statement of Treitschke. To List the cosmopolitan ideal is bad, not in itself, but because it is not practical politics. The ideas of Smith's "school" would do very well in a federation of Europe for political purposes. Internationalism must not be partial; all nations must be under one system of law if they are to be under one system of trade. There is a remarkable anticlimax in his eleventh chapter where, after showing the grandeur of the internationalist ideal, and also how by many inventions in communication this is being made more possible, he scraps the whole thing with the remark that it "has omitted to take into consideration the nature of nationalities and their special interests and conditions." In a true confederation, the spare capital of one district would flow over the whole area and increase everywhere the material basis of higher development; but, as things are, *nations* will keep their resources for themselves and their colonies, and kill the attempt to start new enterprises abroad. Each nation must take its destiny in its own hands, and create for its own needs a full national economic policy, and other things will be added unto it

thereby. When it can speak on equal economic terms with England, that will be the time for Germany to consider cosmopolitan ideas again.

But would not this development take place in Germany in any case? It is true, he argues, that experience teaches that "the wind bears the seed from one region to another; but would it on that account be wise policy for the forester to wait until the wind in the course of ages effected this transformation"? Germany must assertively seize the chance, in view especially of the higher things which economic nationalism brings with it.

What are these other things? List calls them "the mental capital of the present human race." Some of the ablest sections of his argument are devoted to showing the relation of industrialism to culture, skill, national energy, education, social order, and a wide outlook on affairs. Law and free institutions help to the progress of industrial power, and in turn are helped by it; it is in the industrial state that "friction produces sparks of the mind." He holds that Adam Smith gave too little attention to this aspect of industry, and too much to material values. It is only in the stir of the great industry that the highest type of life can grow. A State that is mainly agricultural will never be a great nation. It is "like a cripple" with only one arm. This idea has taken many forms since List. There is a valuation of industries, in which agriculture stands low, and the iron and shipping trades high, a valuation made from the standpoint of prestige rather than profit. It is not its unprofitableness that List objects to in the agricultural state, but "dullness of mind, awkwardness of body, obstinate adherence to old notions, customs, methods, and processes, want of culture, prosperity, and liberty." It has a "low idea of the value of time." Germany was to work for a culture rooted in experience of affairs, in the strain of industrialism on nerve and brain, and braced by the feeling of co-operation in a national purpose. The Trade-State is the basis of the Culture-State.

This is to be instead of Germany's old speculative culture, which turned her energy away from affairs.

He was writing during the Free-Trade agitation in this country. He had, therefore, to remind Germany that the power of England was built up, as one organic whole, by a system that was not cosmopolitan. England was not to employ the "very clever device of kicking away the ladder," or expect other nations to adapt their policy to hers.

List is an idealist, whether he speaks of internationalism or of nationalism. Cancel his internationalist hopes for the distant future, which such writers as Treitschke do not want to entertain on any terms, and List's *National System* is still the economic supplement of German political aspiration. That industrialism should be extended in the interests of personality may seem a strange teaching now that the "social problem" is charged against this very industrial development. It can at any rate be said that in Germany the men who were influenced by List's point of view were not only the historical school, but also the Socialists of the Chair. They were much nearer to the Chair than to Socialism, but the Eisenach Congress and subsequent social forces in Germany have made them influential in those schemes of organisation which were meant to balance the evils of industrialism, and which have influenced social study all over the world.

List's argument goes over into politics through the idea of security. Between the individual and mankind there is the nation. But is there not also the family, the city, the clan, and the nations that are within nations? If the aim of this policy is in the end a non-material one of personal development, why are restrictions to be imposed only on the frontiers of the great national groups? If it is good for Germany, why is it not good for Prussia alone? Because of war; and thus the question becomes economico-political. Foreign supply and demand are not to be depended on; and it is obvious how this carries us over into the question

of sea-power as an integral feature of nationality. And it gives List one of the fundamental ideas of his work; just as to Treitschke the State is power, in its political aspects inward and outward, so to List it is power that matters to it economically, and not merely the present wealth gained by exchange. The State must have a reserve; must be able to rely on itself against the stoppage of international economic exchange; as "the tree is more important than the fruit." Here he believed he had found a weak spot in *Smithianismus*—the worship of mere exchange. "The idea of perpetual peace," he says, "forms the foundation of all Smith's reasonings"—a strange remark to make of the writer who held that "defence is of more importance than opulence." It is plain that this will carry us beyond the creation of such reserves and resources at home; for there are products which are essential to industrialism—oils, fibres, gums, chemicals—which no degree of protection could establish in a temperate zone. If there is to be an all-round reserve of power, this therefore implies colonies in the New World, and colonies imply a navy. The programme of *Weltpolitik* opens out on its economic side. "Can it be deemed sensible to acknowledge the title to an entire quarter of the globe to vest in the man who first erected a pole adorned with a piece of silk?" And hence "rectification of territory is in many cases a justifiable reason for war."

The case for economic nationalism, in its fullest extent, has been developed since his time by arguments to which List was himself opposed; but we are very familiar with them nowadays. He does not regard colonies as a necessary outlet for *surplus* population and products. This is a later development due to communication and transport and to the problem of markets. It cannot be said that there is a consistent opinion, either here or in Germany. It depends on the political mood of the time whether emigration is regarded as a mark of distress at home, or as a contribution to the strength of the nation in the colonies. At

one time even colonial emigration is charged against our land system, as a thing which we can and ought to prevent by better laws at home; at another time we are glad of the pioneers who are to unite the Empire, and prevent the Americanising of Canada. In Germany there has appeared, as there did recently here, the idea of colonies as an outlet for surplus, and therefore a necessary supplement of the healthy economic life of a modern State. Emigration, as distinct from colonisation, would supply the remedy, and does so at present; but the political ideal of nationalism bars this as a permanent settlement of the question. Let us consider the statement of Seeley in 1884. "Colonies in the abstract," he says, "are neither more nor less than a great augmentation of the national estate. They are lands for the landless, prosperity and wealth for those in straitened circumstances. . . . Never any nation was half so much cramped for want of room as our own nation is now. Populations so dense as that of modern England are a phenomenon quite new at least in Europe." Not in Treitschke so much as in such men as Bernhardi, and in the current popular politics of Germany, this idea reappears. To Treitschke, it is the political mission of colonists that dominates the question. What are we to say of this economic claim, for it is put as a case of distress, giving a nation that is without habitable colonies the wretched choice between a social problem at home and the loss of the nationality of those who go abroad?

List did not support the idea. On the contrary, he held that Malthus was in error in fearing the growth of population beyond the means of subsistence. It is "mere narrowmindedness to consider the present extent of the productive forces as the test of how many persons could be supported on a given piece of land." Who is to set limits to discovery and invention? Every nation draws on the whole world for supplies, and he saw no necessary end to this fund, as new areas and processes would come into view. But to-day the idea of surplus in people or produce

is felt to intensify the colonial claims; and the position may be examined.

How is it to be decided that a country has a surplus population to dispose of? The general argument refers to the growth of the wants of a nation, its consuming power. And as nations grow in population, attention tends to be given to this side of the result specially. But if there are more mouths to feed, by the same result there are more hands to feed them. It is the task of social and industrial organisation to adjust to each other the increases in demand and supply. This does not mean that a nation must continue to supply the wants of its people solely from the resources of its own land. It has no economic surplus so long as it can meet the problem by the use of both its own labour and capital, and the nexus of foreign trade. Its resources include exchange; and this is also true of districts within a nation. It would be difficult to show that any nation had found this problem too much for it. The mere fact of emigration does not prove it. There is inevitably a movement of the population of the world from place to place; not because they could not be maintained at home, but just because of the freedom of the will. There are the same movements within national frontiers. One occupation is given up for another, for reasons which are special to each case—friends, the location of industries, the attraction of the city or the New World. People are not *adscripti glebæ* or *civitati*. Nations which emigrate largely may also immigrate largely; this double movement obtains even in our own colonies. It would be difficult to put to the test of facts the grievance that is implied in the idea of surplus population. The German overseas emigration, which is what Bernhardi counts, is only some 20,000, and has fallen rapidly in the last twenty years. But we do not know the German emigration to other places in Europe, which must be reckoned in deciding this question of economic surplus. That it would matter to the argument is shown by the Belgian figures, which are more fully given,

and indicate that the emigration to Europe was nearly ten times the overseas movement in 1911. And there is the reverse movement to consider. Mr. Rowntree informs us that there is a slight but growing balance of immigration into Belgium; and this is the densest of European countries. The problem of organisation has been met, so that although there is change of the people by foreign movements, this does not mean that the outward movement had distress behind it. The great emigrant countries of Europe—Italy and Austria—are not high in the scale of density. Were we to quote emigration as "surplus" with the implication of distress, what would be made of the facts regarding Australia and New Zealand? In 1909 and 1910 emigrants from New Zealand were 66,000, against 74,000 immigrants; in Australia the same comparison gives 113,000 against 179,000. The fact of the emigrant remains to be explained, spite of the balance of immigrants in these cases. It is, at least, too easy a disposal of the facts to equate emigration with "surplus" of people. The second colonial empire is the French, and France has a declining population. There are cases, such as Ireland, where a failure of organisation promotes emigration, but it is not the usual case, and Germany would not accept such a contention about its industry.

The argument is also based on surplus products. This is a hard idea to define, since foreign trade is not made up to any extent of forced sales. Colonies are good markets for a mother country, since language and preferences will expand her trade in that direction; but this is not the same idea as existing undisposable surpluses. The world being limited, strong preference in new markets of great size in favour of some old countries might come to be a just ground for resentment in other countries. But there is one aspect of Germany's trade which is the probable cause of the idea in question. Her organisation is based on syndicates which, aided by her tariff, have been in the habit of keeping the home market under a restriction of output, while in

order to gain the economies of "running full," they make a larger supply and sell the balance abroad at lower prices than at home. This condition of things, though its results do not count for much in Germany's foreign trade, has at times drawn public attention to these exported "surpluses." Colonisation would not affect this policy. Both as to population and products, the claims made are somewhat intangible. The international movement of people and goods, like the national one, is based on normal social and industrial forces, and detailed information would be required to show that any part of it was forced. There is only the phrase, which identifies "outgoing" with "surplus."

IV

The idea of the State as Power will naturally react on the conception of civic duty and discipline. There are two ideals which on different grounds may be equally attractive —that of great personal freedom within the State, and that of great subordination to the purposes of the State. Each of these can be made the subject of either eulogy or criticism. They are harmonised or compromised by the idea that, as personality is only fully attained in civic and social life, personal freedom implies some degree of discipline, and is not the same as individualism. When that is granted, the nature of the personal freedom becomes largely one of the nature of States, and of the kind of national life with which the citizen has to identify himself. It was an essential idea of Kant's that true freedom lay in subjection to a law, and it has also been a religious maxim that "service is perfect freedom." It depends upon the willingness of the service, and that in turn upon an understanding of the final purposes of obedience. It is therefore particularly useless to discuss the intensity of government in a foreign country like Germany without regard to its position in history and on the map. Treitschke argued that the State

is Power, but was quite consistent in saying also that there must not be too much of the State ; just as we in our political science say that the State is government, but the country must not be too much governed. The amount of government which a country must have is a question of pressures from without and within, and of reaction to these pressures. All is subject to the principle that the State must maintain itself, and that there is no limit to the right of self-defence. It must maintain itself, because it affords the environment within which a certain type of mankind can express and realise its genius. The argument for freedom has to be stated within the compass of this dominant and accepted fact. Different degrees of government are therefore willingly admitted in different nations, or in the same nation at different times. Thus we find Seeley, in his *Political Science*, justifying the Prussianising of Germany as a success proved by the history of a hundred and fifty years ; and frankly defending acts of religious intolerance in this country as required by the exigencies of the time. The State was threatened ; that clears all other scores. Land frontiers have imposed on the great European nations forms of civic restriction which this country has escaped ; and, in current criticisms of German administration, we are apt to forget our own special good fortune. England is saved from the " Continental climate " with its possible extremes of tension. We see in the German White Book how mobilisation is their main thought, while we are working for negotiation. That relativity of policies, political and economic, which the German " historical school " has accepted since List, finds here another application. Prussia's position in Germany, and the citizens' " liberties " in Prussia, are difficult to criticise impartially in a nation which has made good in imperial politics, and has a sea frontier. It has recently been held by an eminent politician in England that " votes are to swords, what bank-notes are to gold." Whatever truth this has, is less remote and derived on the Continent than with us. Treitschke's Essay on Liberty comes to the

same conclusion as any other Essay on Liberty, that the State should not take more power than it requires.

What is specially emphatic in his teaching is the doctrine of the "sovereignty" of the State. Among the loyalties of which people's lives are made up, he places the State's claim not only above other civic loyalties, but above mankind. This is one of his main differences from List. Behind his teaching in this respect is the idea of trusteeship which has been already referred to, and his view of progress as a rivalry of genius and ideals. This is the idea which he vitalises with such statements as that "the rays of the divine light only appear in individual nations infinitely broken; every people has the right to believe that certain powers of the divine reason display themselves in it at their highest." In falling back on the "divine plan," he follows German tradition; German idealism has given this mental hinterland to her social philosophy. And it will be remembered that, in moments of patriotic fervour, this same principle of the "sovereignty" of the State has been asserted here in the maxim, "My country, right or wrong."

It follows that Treitschke regards some developments as impossible, notably the submission of national policy to the judgment of a tribunal of the nations. He does not say that this is impracticable, but that it is wrong. The State may limit itself by treaties—that is a voluntary and sovereign act; but it may not limit itself absolutely, only with the reservation *rebus sic stantibus;* a maxim stated in the same terms by Bismarck. This does not come to very much if it means only that "treaties which have outlived themselves must be denounced." It is not Treitschke's teaching which has been applied by the German military authorities at the origin and during the conduct of the war. A man of no eminence by comparison—Bernhardi—has hardened the tone, and forgotten those qualifications of State policy which Treitschke advocated in opposition to Machiavelli.

The doctrine of the sovereignty of the State is a high

application of the question of the rights of minorities. On any tribunal, a particular State or group would be a minority, and then what right has it to refuse the award of the majority? What right does Ulster claim, and on what considerations does it throw us back? A minority has a right, after the award, (1) if it represents one common ground of disagreement, not the sum of a number of different grievances, like the Cave of Adullam; (2) if it represents a body localised enough for organisation, so that it can prove its conviction; (3) if the ground of disagreement is more than a material interest, and goes back to such fundamentals as race and religion. A nation, in relation to a tribunal, is a minority of that kind. Its sovereignty depends on its trusteeship. Race and religion define nations in their later growth with lessening exactness; but their place is taken, after frontiers have cut across nationalities and made States, by what is really a secondary religious influence—tradition, sanctified by war. "It is neither for government nor minister that the soldier falls. Lying there in agony, sinking into darkness, he has in himself the consciousness of this far greater thing, this mysterious, deathless, onward-stirring force, call it God, call it Destiny—but name it England. This is the spirit-purpose which binds century to century." So writes Professor Cramb, while claiming also that we dare not arraign the claims and ambitions of another nation whose great historian wrote in the same way of "the State that protected our forefathers with its justice; which they defended with their bodies; which the living are called upon to build further, and more highly developed children, and children's children, to inherit." For the defence of this inheritance it is claimed that "Power is the principle of the State, as faith is of the Church, and love is of the family." Is it with this, or a perversion of it, that we are at war? Is her militarism a true or a debased expression of German culture? What have we gone forth to destroy?

IX

GERMAN RELIGION AND THEOLOGY

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In the famous *Discourses on Religion*, written in the times of the French Revolution, Schleiermacher made a passionate appeal to an irreligious generation, and gave his reasons for looking to Germany for the expected spiritual revival. "It is no blind prejudice for the fatherland," he says, "which makes me address myself to my countrymen, but a profound conviction that they are the only people who are capable and worthy of being stirred to a sense of holy things. Yonder haughty islanders, by many unduly revered, know no watchwords save profit and happiness: their scientific zeal is a sham-fight, their philosophical diamonds are of paste, and their sacred freedom is on the whole the tool of their self-interest. They take nothing seriously except what palpably pays. Similarly they know nothing of religion save that they have a bias for its time-honoured customs and dogmas, and regard it as a useful auxiliary in the struggle with their hereditary enemy. Still less, I confess, do I feel disposed to address myself to the French, who have lost all capacity of reverence, and whose rulers are arrogant enough to bid defiance to the eternal laws of the universe. For an audience I am driven back on the home-land, whose genial clime makes it a veritable garden of the spirit, and in which everything that adorns the life of man develops, at least by way of sample, in its fairest guise. It is, then, in Germany," he concludes, "that religion must find a sanctuary from the sheer barbarism and the chilled and worldly spirit of this age." [1]

[1] *Reden über die Religion*, Cap. I.

The claim thus made by Schleiermacher might well have been couched in more modest and less truculent language. Yet he was not wrong in ascribing to his people an unusual capacity for religion. The German character is no doubt extremely complex. History and fiction alike reveal the widest diversity of individual types, and leave us puzzled as to how the same stock could throw off such classic examples both of the high-souled and warm-hearted idealist and of the coarse and selfish brute. Whatever the explanation, the national character undoubtedly has a store of qualities which pay abundant tribute to the world and the flesh, and it likewise contains a root of piety which has flowered in religious heroes and epoch-makers, in noted saints, sweet singers, and philanthropists, and also in a multitude of nameless folk, known as "the quiet in the land," who made religion seem to their children and their friends to be the fairest flower of the human spirit. The people may also claim to have been entrusted with a religious mission. The paganism of the ancient Germans had a note of moral earnestness and even sublimity, while in Christian times there have been two occasions when the German mind has asserted a title to the leadership in religious thought.

A. Teutonic Heathendom

Light is thrown on the religion of the ancient Germans from a variety of sources—the accounts of Cæsar and Tacitus, notices in early ecclesiastical writers, survivals in northern folk-lore, and especially the Eddas, which worked up the traditions and the mythology of the Scandinavian branch of the Germanic family. The nucleus was the religion of the primitive Aryans. These believed, like their neighbours of earlier race, in ghosts and demons, and they trafficked in occult powers and magical rites, but they had also groped after a better manifestation of the Highest,

and they dimly discerned the divine in the great objects and forces of nature. The spiritual inheritance was developed in similar fashion by the Aryan tribes who settled in Northern India, and by the Teutonic stock which established itself in the regions of Northern and Central Europe. Like their Oriental kindred, the Germanic family continued to be in bondage to animistic superstitions, such as invest the lot of the savage tribes of to-day with deep gloom and manifold terrors. A considerable part of the business of life was to conciliate the goodwill, and to frustrate the machinations, of evil-minded or capricious spirits. Guidance was sought, both for public and private affairs, from dreams, omens, and the casting of lots. They were less addicted to sacrifice, according to Cæsar, than the Gauls, but it was still common, and in time of great peril or calamity they sought to appease the angry gods with the blood of human victims. But the Germans also guarded the better deposit from the Aryan tradition, developed a doctrine of the gods which is at least as elevated as that of the Indian Vedas, and also found some recognition in religion for the claims of morality. The ancient Germanic divinities, whose names are enshrined in our days of the week from Tuesday to Friday, had the same origin and significance as Indra and Agni, and the other "shining ones" of the Indian creed. What Carlyle says of the old northland mythology goes to the heart of the matter—"I find it to be the impersonation of the visible workings of nature, earnest, simple recognition of the workings of nature as a thing wholly miraculous, stupendous, and divine."[1] There was also a marked tendency, as in the Vedic religion, to magnify the attributes and works of some one of the great divinities until the mind came within measurable distance of recognising the supreme and only God. Tys or Tyr, the supreme deity of the oldest period, fell later into the background. Wuotan, Wodan, or Odin, originally perhaps a personification of the wind, became the god of battles, and also the creator and pre-

[1] *Lectures on Heroes*, I.

server, the dispenser of the blessings of civilisation, and the ruler of the world. Donar or Thor, originally the god of thunder, and later the patron of agriculture, was likewise exalted in popular homage above all other gods. There is ground for supposing that Thor was the best-loved god in an earlier and ruder stage, and that he was gradually eclipsed by Odin the All-father as the life of the people became richer and more refined.[1] Tacitus declares that the Germans had neither images nor temples: they thought that the gods were too great to be represented after the similitude of a man, and they deemed the forest or the grove, and not a temple made with hands, to be the fitting abode of the divinity.[2] He was mistaken about the absence of temples and the proscription of images, but he may have had information which enabled him to vouch for a strain of spirituality in the religion of the ruling class. It may be said with more confidence that among the Germans the all-important step was taken of weaving together religion and morality, and that they went further than any people save the Persians in developing Aryan religion under a sense of the paramount claims of conscience, and of the infinite difference between moral good and evil. Odin was interested in good morals as well as in battles. The Teutonic tradition supplied the name of Hell, as well as ideas of future punishment, to be a terror to evil-doers. As in the old-Persian faith, the secret of the universe was conceived to be a sustained and not unequal conflict between the powers of light and darkness, who also stood for the contrast of righteousness and wickedness; and it was in the spirit of the common Germanic inheritance, if also with some admixture of Christian elements, that the northern skalds perfected their sublime world-drama which told of the warfare of the gods and the giants, the craft of Loki, the death of Balder, the twilight of the gods, the destruction of the frame of things, and the final redemption

[1] Craigie, *Religion of Ancient Scandinavia.*

[2] *Germania*, 9.

and blessedness of gods and men in a rejuvenated and abiding universe.

The adhesion of the Germanic tribes to Christianity began in the fourth century with the conversion of the Goths, who had made their way across the Carpathians into the valley of the Danube, and the process was completed seven centuries later when Norway was reluctantly shepherded into the pale of Christendom. The Goths, who heralded the Teutonic migrations that overwhelmed the Roman Empire, had received Christianity in the heretical form of Arianism. The Franks, who established a German dominion in Gaul, the Angles and Saxons who swept the Romanised Celts before them with the besom of destruction in England and Lowland Scotland, and the main body which clung to their ancestral seats in central and northern Europe, all fought their battles under the protection of Thor and Odin, and after their conversion they accepted the Catholic form of faith as it had been fixed at Nicæa and endorsed by the authority of Rome. It is somewhat of a problem why the German tribes became Christian. In these days it was held self-evident that the power of a God and the worth of a religion were tested, alike for nation and individual, by the success and prosperity which they secured, and it might well have been thought foolish to desert the gods, under whose sign they had prevailed, for the powers which had proved unable to defend and preserve the Empire of the Latin race. The Christian code of morals, moreover, inculcating as it did meekness, love to man as man, and the forgiveness of injuries, seemed little calculated to make a sympathetic appeal to the spirit and taste of the conquering and plundering hordes. If there be any truth in Nietzsche's contention that the population of the Roman Empire accepted Christianity because it had become enslaved and decadent, it ought to have been utterly repugnant to the virile and liberty-loving peoples which smote down the tottering fabric of the Empire, and at least supplied the racial material for a fresh

chapter of great achievement in the history of the race. The motives of the barbarians in embracing the Christian faith were doubtless very mixed. A good deal of evidence can be adduced in support of the case that the change of religion was due to self-interest, or superstition, or to the mere statecraft of the rulers. When the Goths were pushed and harassed by the Huns, they were admitted by Valens to the security of the Roman territories on the Danube on the condition that they should all abandon heathenism and conform to the religion of the Empire. It is related that Chlodwig, when hard-pressed in a great battle, vowed henceforth to serve the Christ in whom his consort believed if He would give him victory, and that in consequence of his deliverance the Franks were baptized and received into the Catholic Church. It would also appear that the princes and kings became convinced, as they readily might, that the Christian religion was better adapted than heathenism to promote social and moral well-being, and that they therefore judged it to fall within their duty as well as their rights to decree the conversion of their subjects in the mass. On the other hand, the natural tendency to conservatism in religion, which found very determined expression among the later Northmen, would doubtless have made the change impossible if the new religion had not impressed the peoples with manifest evidences of its intrinsic superiority, and also found points of contact in the best elements and aspirations of their pagan past. The Catholic Church must have touched the imagination as the symbol and guardian of the higher civilisation which looked down upon them from the Græco-Roman world, while its noble fabrics, its solemn pageants, and its imposing ritual must have been felt to body forth somewhat of the majesty, the splendour, and the repose of a heavenly world. Above all, there were features of their paganism which had prepared them to welcome the new faith. The doctrine of the supreme God, after whom they had groped, was brought near to them in an unclouded glory of infinite power,

wisdom, and goodness. The racial genius that created the character and the tragedy of Balder had a real capacity of understanding the crucified Christ. "From of old," says Treitschke, "the Germans felt a deep yearning for deliverance from the curse of sin. They alone of all the peoples of Europe had in their heathen days a foreboding of the doom of this wicked generation, and of a new world of purity and light which was to be. In such a people the joyful message from Jerusalem found hearts prepared for it, and how reverently and devotedly they received the new faith is told in the marvellous structures of their old cathedrals." [1]

B. Germany and the Reformation

The Middle Ages, extending from about the end of the fifth century of our era to the beginning of the sixteenth, occupied the middle space between the glory and the strength of Classical Antiquity which had passed away, and the greater achievements of the Modern Age which was to be. It is not, however, to be supposed that the interval was sheer loss, and a waste of the world's time. Medieval Europe had a greatness and a striking glamour of its own; and the special significance of the thousand years was that it was the stage at which the youthful and gifted peoples which had made so tumultuous an entrance upon the scene were placed at school in order to be educated and disciplined for their future career. The political event which marked the close of the age of Antiquity was the fall of the Roman Empire of the West before the Teutonic migrations, and the following centuries witnessed the gradual consolidation of populations into the nationalities which were to contend for the hegemony of modern Europe, and to map out colonies and dependencies in every other continent of the globe.

The scope of the education was that the new peoples

[1] *Luther und die deutsche Nation.*

were set to assimilate elements of the civilisation which had been transmitted from the old world in law, custom and literature, and not least that they were grounded in the Christian faith, leavened by the ethical teaching of the Scriptures, and made to suffer in penances and excommunications for wrong-doing and contumacy. The chief features of medieval history were entirely appropriate to the school-days of the nations. The members freely wrangled and fought among themselves; they banded themselves together in the Crusades for a trial of strength with the hated rival school of Islam; and they had a prolonged feud with the authorities in the form of the conflict between the Emperor and the Pope. But as yet the quarrel with the Church only concerned temporal affairs and political rights: the mandates of the master were accepted without question in respect of the matter and methods of the teaching; and the prescribed tasks were worked out by the gifted pupils with extraordinary assiduity in the doctrines and dialectics of the Scholastic theology. At the close of the era, the schooling had so far served its purpose that the estate of tutelage was outgrown; and the nations gave evidence of their maturity in the Renaissance movement and in the upheaval of the Reformation—which latter, in view of its far-reaching effects in the intellectual political and social as well as in the religious spheres, has been generally regarded as marking the transition to the new and more brilliant era of Modern Times.

The Reformation is accounted for in average Protestant thought as a victory of truth, which was prepared for by the new learning, which followed upon the recovery of the Scriptures, and which was inspired and directed by the Spirit of Truth. The German interpretation lays the utmost stress on the contribution of criticism and insight which was made by the peculiar character and genius of the Teutonic race. The third and great epoch in the development of Christianity is described as that in which, after having been intellectualised by the Greeks and externalised by the

Latins, it passed into the wiser and safer custody of the Germanic mind. Fichte speaks of the Reformation as the latest consummate achievement to date of the German people—"in a sense its perfect act of world-wide significance."[1] It originated in the soul of Luther, and was rooted in his life-work, and Luther, we are told, was a uniquely representative man—the incarnation and compendium of all German qualities and traits that command respect or inspire affection. "A foreigner may well ask in bewilderment," says Treitschke, "how such strongly contrasted characteristics could be combined in a single personality—the energy of destroying wrath and the inwardness of devout faith, sublime wisdom and childlike simplicity, so much deep-hearted mysticism and so much of the joy of living, such untutored roughness and such tenderness of heart, the pride that emboldened him to write himself 'evangelist by the grace of God,' and the humility which flung him in the dust crushed in spirit before his God. We Germans see no enigma; we simply say, 'That is blood of our blood.'"[2] The Reformation was primarily a revolt against the religious theory and the moral defects of the medieval Church, and this revolt involved a repudiation of the authority of the official organs of the institution, with the affirmation of the autonomy of the individual mind and judgment. As regards both its negative and positive aspects, it is said, the spiritual revolution had its spring in the religious depth and moral earnestness of the German type of character, and not least in the spirit of liberty which from of old has been the breath of life to the soul which utters itself in Teutonic speech. The subject is of so much intrinsic interest that it is worth while reproducing the argument in more detail.

1. The mainspring of the Reformation movement was a spiritual interest. It raised anew the fundamental religious issue,—What must a man be or do to reach a right

[1] Die vollendete Weltthat, *Reden an die deutsche Nation.*

[2] *Luther und die deutsche Nation.*

relation with God, and enjoy enduring peace and security? The medieval Church had elaborated a scheme of salvation which made the individual dependent at every point on the mediatorial offices of the divine institution. He was quickened, energised, and built up by the grace which it infused through the channels of the seven sacraments, and he was directed to offer satisfaction in penances, and to accumulate merit by works of supererogation; but when all was done the sensitive and earnest soul was left without any firm assurance that it had found the way of escape from sin and its penalties. In opposition to this scheme, Luther proclaimed the Gospel which had as its watchword Justification by Faith. This doctrine meant that the soul has direct access to God, and dispenses with all priestly mediation save that of the God-man, who died for our sins and ever liveth to make intercession for us, while the sovereign blessings of acceptance and forgiveness are vouchsafed because of the condition of the heart, and may be claimed in childlike trust from the divine mercy as a gratuitous boon. The moral energy of the Gospel was given in the fact that saving faith involved a radical change of character naturally unfolding into a life whose strength was the virtues and its beauty the Christlike graces. The sum of the matter, as put by Luther in his treatise *Of Christian Liberty*, is that a Christian is made to be free by faith from every yoke, but only to the end that, enslaved by love, he may become the servant of all. With this scheme of evangelical Christianity, it is said, the German spirit has an instinctive affinity. The mass of the nation was spiritual enough in the sixteenth century to find the deep religious theory to be intelligible, and also to be more attractive than all the competing interests of trade and politics. It was the gospel for which burdened German souls had yearned and agonised throughout the spiritual night of the Middle Ages. In later times, it is added, the German mind has clung to the elements, and preserved the spirit of the evangelical creed, even when it has discarded

much of the original apparatus of evangelical doctrine. In the greatest philosophical systems it continued to be recognised that the fundamental problem is that of the relation of the soul to its God, and that the act which saves—however much or little may be understood by salvation—is the venture of faith. It may also be thought significant that the most radical theological schools of Germany glory in the name of evangelical, and hold that they are fully entitled to it inasmuch as, like Luther, they make no claim of human merit, but magnify the grace of God, and count it to be the greatest thing in the world to have the filial consciousness of a child of God.

2. The medieval Church, it is said, also came into collision with the German conscience. The immediate occasion of the Reformation was the traffic in indulgences, which, though capable of a more respectable scholastic explanation, were popularly understood to offer a permit, in consideration of a money-payment, for a life of sinful license. The burgesses resented the cupidity of the Church in the matter of tithes, and to a wretched peasantry it seemed the worst representative of the classes that lived in idleness and luxury, and ground the faces of the poor. Hypocrisy, it is also said, was never a German vice; and when it appeared in the light of the Scriptures that much of the doctrines and rites of the Church was human invention, the Italian way of disbelieving and sneeringly conforming was impossible for German candour. It might be done roughly and even brutally, but the German was forced to utter all his mind. It was also revolting to the German sense of justice to inflict upon a man the supreme penalty of the law for doing a thing so natural and inevitable for a German as making use of his intellect. "To burn a heretic," said Luther, "be he ever so wicked, is contrary to justice and God. Heretics are to be overcome, not with fire but with writings, as the ancient Fathers did." [1]

The ethical revolt against the Roman Catholic system

[1] *An den christlichen Adel deutscher Nation.*

is further explained by observing that the medieval Church paid homage to an ideal of human perfection in which the German mind had never really believed. It had a very vivid vision of the world to come, and a deep aspiration after heavenly perfection and bliss, but it also found this earth very good as a place of rich experience, of solid work, of daring adventure, and of noble achievements. It was therefore predisposed to reject the ascetic ideal—with its preference for the contemplative life, and its glorification of poverty and celibacy—as an utterly inadequate conception of the chief good for man. German writers declare it to have been no private opinion of Luther, but the expression of an ingrained conviction of his race, when he proclaimed that there is no higher service of God than that which is rendered in the fear of God within the natural spheres of the home and the calling, and that the worshipping and beneficent Church is only a domain of the far-branching Kingdom of God, which has its other officers in kings and princes, and all others who exercise authority under them.

3. In contending for a better gospel and a fuller moral ideal, the Reformers inevitably raised another issue which may be deemed of still greater moment, and which had at least more varied and more far-reaching consequences. The question thus stirred was whether the spirit of liberty which is said to be native to the German soul, which demands freedom in the many forms of that "noble thing," and most of all in the region of mind and conscience, was to be held in subjection by an external and despotic authority. For Luther the issue was,—Could he, the individual member of the body of Christ, claim the right of private judgment, or must he submit against his better knowledge to the authority of the Papal hierarchy? His answer was given in the famous Leipzig declaration:

"I believe that I am a Christian theologian, and live in the Kingdom of the truth; and therefore I will be free and will yield to no authority, whether it be of a Council or of

the Emperor, or of the universities or of the Pope, so that I may confidently confess all that I know as truth, whether it is asserted by a Catholic or a heretic, and whether it is accepted or rejected by a Council. Why shall I not venture the attempt if I, one man, can point to a better authority than a Council ? "

The claim of liberty, as made by Luther, was, of course, severely limited in its scope. He appealed from the authority of the Church to the authority of Scripture, and he admitted no right to seek another seat of authority, or to dispense altogether with such external support or check. But in asserting the right of the individual to break with authority, and also to be the interpreter of the authority which he acknowledged, he took a step which inevitably issued in the claim of the human mind to a liberty of far vaster sweep. It logically led to the complete emancipation of philosophy and science from the control and embargo of the Church, and to the freedom of individual thought and speech which is the accepted privilege of the modern civilised world.

The explanation of the Protestant Reformation as a characteristic expression of the German spirit is supported by certain obvious facts. The Reformation originated in two Teutonic centres—one a principality in the heart of Germany, the other a Swiss Canton which was an outpost of German stock and speech. And it only needs a glance at the map of Europe to show that the racial character must have been an influential factor in procuring acceptance for the principles and the ideals of the Protestant form of Christianity. The Protestant area is roughly co-extensive with the territory which was settled or conquered by tribes—High German, Low German, and Scandinavian—which have been conjoined on linguistic and other grounds as forming a distinct branch of the Aryan family. In France, Italy, and Spain the deposit from the Teutonic migrations was relatively small, and in the Latin countries Protestantism has, on the whole, been a languishing cause. On

the other hand, the German claim is subject to considerable deductions or qualifications. To begin with, the Reformation was not the masterpiece of a religious genius which struck in with creative energy: at the most it evidenced German receptivity for sublime ideas which had long before been put in circulation as the gospel most profoundly adapted to the needs of sinful and mortal men. The scheme of evangelical thought was expounded by Augustine and other fathers of the Western Church, while the doctrine of Justification by Faith and the ethical principles of Protestantism had both a still older source in the writings of St. Paul, who was by birth a Jew and by grace the disciple of Jesus Christ. Further, on a closer examination of the facts, we make the curious observation that the German people, as a whole, has been less responsive to the Reformation than the population of Great Britain. Roman Catholicism has more than held its own in Southern and Western Germany and in German Austria, while England and Scotland became sturdily and almost solidly Protestant, and this in spite of the fact that they contained a large and powerful Celtic body in the populations of Wales and the Scottish Highlands. It is undeniable that the Teutonic strain must have had much to do with Protestantism, but it would appear from these facts that it was most effective for the purpose when it had assimilated neither too large nor too small a proportion of diverse racial elements. Of the qualities which are specified as making the German people naturally Protestant, there is at least one which has existed in greater strength in those regions in which the "Teutonic stuff" was at the most the prepotent factor in national character. It must be left to the Searcher of hearts to judge of the prevalence of true religion and pure morality, but the love of liberty, which was one of the main roots of the Reformation, lies well open to human observation; and whether we have regard to political history and the struggle for self-governing liberties, or to the individualism which demands not only the right of private judgment but also the fullest

elbow-room for the management of one's life, it does not appear doubtful that its chosen embodiment has rather been the Anglo-Saxon stock, and the new American race which has so largely reproduced the idiosyncrasies of the Anglo-Saxon type of character and civilisation.

Almost from the beginning Protestant Christianity was broken up into the two divisions of Lutheranism and the Reformed Church narrowly so-called. The Lutheran form had little success in propagating itself beyond the borders of Germany and the Scandinavian countries. Holland, Britain, and America have, on the whole, preferred a different type of doctrine or of ecclesiastical polity. The reason of the breach of the main body of the "Reformed" with Lutheranism was that it was too conservative—that it compromised with Roman error in its doctrine of the Eucharist, and generally was too timid about making a clean sweep of traditional ideas and practices which had no clear Scriptural warrant—and perhaps, also, that it came to give an uncertain sound as to the doctrines of divine sovereignty and election, which were felt by persecuted minorities to be of vital moment in the struggle against the almost overwhelming power and craft of the realm of darkness. Butler laid his finger in the caricaturist's own way on the more radical spirit of the Reformed, who seemed to him to think and act

> "As if religion were intended
> For nothing else but to be mended."

For the same reason it might have been expected that a friendly alliance would have been established between Lutheranism and the Anglican Church, as the latter has also stood for a *via media* and a strong deference to ecclesiastical traditions, while it possesses in its Thirty-Nine Articles a symbol which has close affinities with the testimony of the Augsburg Confession. As a fact, the early relations of the Lutheran and Anglican Churches were governed by a conviction of the essential unity of the

Churches of the Reformation. In the later period complete estrangement has taken place. Lutheranism, in its representative voices, failed to maintain the reverence for tradition which moves the Anglo-Catholic mind to attach the note of infallibility to the decisions of the undivided Church of the early centuries. Barriers were also created by the ecclesiastical principles of the Lutheran Church, as it not only asserted the priesthood of the laity, but took the principle very seriously, treated the issue between Episcopacy and Presbyterianism as one to be settled in the light of experience and expediency, and held that it is only purity of teaching and Scriptural dispensation of the Sacraments, not external incidents like apostolic succession, which are relevant in determining the claim of a Church to rank as a true branch of the Church of Christ.

The sixteenth century, with its evangelical faith and experience, its assertion of spiritual liberty, its heroism, and its Martin Luther, was the golden age of German religion. It was followed by an age of bronze, if not of iron. In the seventeenth century the Lutheran Church exhibited some of the characteristics of the English Puritan movement, but it had more in common with the doctrinal hair-splitting and the pedantry of the Puritans, than with their religious and moral inspiration. The period is known in Lutheran history as the age of Protestant Scholasticism. The German mind was then applied, with its characteristic laboriousness and thoroughness, to elaborate and defend the details of a doctrinal system based on the tenets of Luther and the "Form of Concord" which was supposed to have the character of finality. The systems built up by these theologians are truly monumental in their kind, but they count for little to-day—save with the conscientious specialist—in comparison with the sacred songs in which the living piety of the time gave thanks for the river of grace which still continued to make glad the City of God.

The age of minute analysis and militant dogmatism was followed by the disintegration of Lutheran orthodoxy.

Two factors contributed to the decay. A reaction began, in the school of Spener, known as Pietism, which shifted the emphasis from orthodoxy to personal holiness, and was content with the simpler type of Biblical doctrine that was involved in, and which made for, the experiences of conversion and sanctification. To Pietism succeeded a Rationalism which threatened to reduce to ruins the imposing ecclesiastical and theological fabric which had been reared on the foundations of the Reformation. The same movement had made much stir from an earlier date in England under the name of Deism—a type of popular philosophy which proposed by an appeal to common sense and universal assent to get rid of the supernatural doctrines of Christianity. The Church of England opposed the drift with a powerful Apologetic that has its classic monuments in Butler's *Analogy* and Paley's *Christian Evidences*, but in Germany the new school of thought invaded and largely captured the Church, and admittedly cast a blight over its whole intellectual and spiritual life. The most popular handbook of doctrine was the *Institutiones* of Wegscheider. This prosaic theologian reduced the Christian doctrines to the articles of God, Immortality and Duty, and is related to have passed a motion in his University Seminary, with one dissentient voice, in favour of the explicit adoption of a new religion. The pulpit was used for the dissemination of scientific ideas, and of technical information useful to peasants and tradesmen, and it could even be thought appropriate to discourse on Christmas Day upon the best fodder for stalled beasts, and on Easter Sunday on the advantages of early rising. Schleiermacher relates that the educated had turned from religion with contempt or indifference, that the women had been unfaithful to the vocation of their sex by laying aside even the profession of piety, and that it only lingered on, after the fashion of an antiquated mode of dress, in the more secluded districts and among the more backward sections of the population. No doubt there was a very considerable remnant which kept alive the

orthodox or pietistic tradition, but on a general view there was left a deep impression of the exhaustion of faith and of the bankruptcy of spiritual life.

C. The Modern Period

In the nineteenth century the Lutheran Church once more asserted itself as a powerful force in the realm of religion. It is largely because of its contribution that the century may be described as on the whole the most impressive, in an intellectual point of view, in the whole history of the Christian Church, while it also displayed notable zeal in the inspiration and guidance of philanthropic and missionary enterprises.

I. Modern German Theology

The preliminary condition of the great modern development of Lutheran theology, as well as of the missionary zeal and the works of mercy, was a renewal and deepening of the spiritual life of the people. The Wesleyan Revival in England had its counterpart in a religious awakening of Germany, which was greatly intensified amid the struggles and sacrifices of the Napoleonic wars. The new and deeper experiences made divine things once more seem to be preeminently worthy of the concentrated attention and the strenuous labour of the human mind, while the revival also generated moral energies which sought an outlet in manifold forms of Christlike service. A second factor of the situation was the ability of Germany to produce men who could bring to the tasks of the investigator an astounding patience and thoroughness, and who in some cases combined this extraordinary capacity for work with the power of sweeping generalisation, penetrating criticism, and speculative audacity. The third favourable condition was that the scholars and thinkers were allowed and even encouraged to cultivate theology under conditions of almost untram-

melled freedom. The Lutheran clergy are, on the whole, subject to the same confessional obligations as in the National Churches of England and Scotland; but the professional theologians, by whom most of the research and speculation was done, were commonly accorded the fullest liberty consonant with a profession of loyalty to Protestant or Evangelical principles as understood in the most liberal sense. It is, of course, easy to give good reasons for a different arrangement: the Church, like every other society, naturally desires to uphold its convictions and safeguard its usefulness; and it is not surprising that it should desire guarantees that those who instruct its teachers will fully share its faith, and will refrain from tampering with doctrines which it believes to be the sources of its strength. But it is at least evident that it was because the Lutheran Church took the risks attendant on a larger freedom that it has produced a literature which has fearlessly explored and worked over every field of theological interest, and which has placed before Christendom almost every possible phase of truth and error, whether historical or doctrinal, along with the materials for forming a judgment on the bearings and merits of every traditional or novel position.

The contributions of Germany in the modern period to religious knowledge, theory, and doctrine fall under three main heads:

(1) The discussion of the nature and validity of religion by a succession of philosophical thinkers of the first rank in connection with their general view of the nature of reality and the meaning of the universe.
(2) The historical labours in the field of Biblical Science, and in the various departments of Ecclesiastical History.
(3) The attempts to find a new basis or method for the system of Christian Doctrine, and to reconsider and restate in accordance therewith the particular doctrines of Christianity.

1. The treatment of religion by modern German philosophers is of capital interest, as some took theology under their, patronage and tutelage, while others laboured to destroy it, and even to discredit the religious view of the world. Whether it be a symptom of the religious instincts of the German nature, or of its intellectual thoroughness, or of the self-consciousness which makes a thinker feel that he is expected to settle accounts with everything that is called great, practically every commanding figure in the philosophical succession deemed it incumbent on him, if not to constitute himself the apologist of Christianity, at least to explain why he rejected it, and what he proposed as a substitute. When faith failed, it was felt impossible to disbelieve and be silent, and when unbelief passed into hatred, it had to make its attitude and its reasons abundantly and even brutally plain. It is, however, rightly claimed that no thinker of the first rank conducted his attack in the spirit and the manner of Voltaire. When modern German philosophy first entered the religious sphere, it cast its shield over the Christian faith. The precedent was set by Kant, who in the spirit of a profounder reason sought to vindicate Christianity against the attacks that had been made upon it by the so-called Vulgar Rationalism. His position was that the dogmas of the deistic creed were not supported by cogent arguments—in fact, required to be helped out by faith, and on the other hand that the peculiar doctrines of Christianity, which had been rejected as products of superstition and unreason, could be shown to embody deep and important truths touching the chief end of man, his relation to God, and the conditions of his realising his spiritual destiny. Hegel included in his all-embracing system a Philosophy of Religion in which he claimed for Christianity the character of the absolute or perfect religion; and he contended that the doctrines which were accepted on authority as above reason, or rejected by criticism as contrary to reason, were really expressions, cast in peculiar modes of thought and speech, of his own views as to the revelation

of the Infinite in the finite, and of the destination of man to find God and himself in conscious union with God. Hegel's Philosophy of History also enunciated a fruitful principle of conciliation. If, as he taught, the real has always a soul of rationality, if everything of moment which has come to be, and has proved itself able to endure, has rested upon some solid ground in the nature and scheme of things, it speaks for ignorance and prejudice rather than insight to take up a merely critical or negative attitude towards a historical fact of the magnitude of the Christian Church and its system of thought. In the later discussion doubts began to prevail as to the identity of Hegelian thought with the substance of the doctrines of historical Christianity. Strauss denounced the reconciliation as hypocritical, and declared that even after a short experience philosophical lions had had enough of attempting to eat straw like the ox. The same doubts were expressed with equal emphasis from the side of Lutheran orthodoxy. But, on the whole, Hegelianism has rendered a service similar to that which was rendered by the School of Alexandria in the ancient world; and it is because of its contribution, as developed on lines made familiar among ourselves by Green and the Cairds, that many who claim the full intellectual inheritance of the modern world have continued to feel themselves one in spirit and conviction with the main body of the Christian society.

During the last two generations Germany has been largely dominated by philosophical influences of a different spirit and tendency. Schopenhauer succeeded for a time to a position only less commanding than that of Hegel, and his fundamental ideas admitted of no compromise with the Christian view of the world and human life. He conceived of the ground of things as being, not a rational principle—much less a personal God—but a blind will which is driven on by an insatiable lust of unmeaning production; and consistently with this he estimated the existence of sentient creatures, and the life and striving of mankind, as un-

qualified and possibly irremediable evils. It is an illustration of the paradox of the German character that, during the twenty years when the people was rejoicing in the triumphs which resuscitated its Empire and consolidated its life, and when it was applying itself with marvellous energy and success to the development of its technical skill and its material prosperity, its higher intellect should have been fascinated and considerably dominated by a philosopher who summed up all in "Vanity of Vanities." The pessimistic mood could not continue, and during the last generation two different types of anti-Christian thought have made a stronger impression on the general mind. One is the monistic philosophy with a materialistic bias which Haeckel has laboured to represent as the view of existence that is inseparably bound up with the methods and achievements of modern science. The other is the scheme of thought which underlies the brilliant but somewhat incoherent writings of Nietzsche. His standpoint may be summarily described by saying that he was an Agnostic who knew and cared nothing about transcendental realities, a Positivist who found the given world a sufficient reality, an Optimist who found the world very good though capable of becoming much better, and a Reformer who proposed to abolish the Christian idea of God as a nightmare, and the Christian morality as the chief obstacle to sane and courageous human progress. It may be added that, amid all the intellectual and moral vices of Nietzsche's system there shines forth a sincerity which would have been more than respectable if it had been allowed freer play by his unspeakable vanity. At the same time earnest and strenuous efforts were of course made by the representatives of older schools of thought to steady the German mind in safer paths. The philosophical shallowness of Materialism was exposed by thinkers like Paulsen, who stood for a spiritual conception of the ultimate reality, while Lotze did strenuous and original thinking in support of a conception of existence within which Christian faith can live and breathe and move.

2. We pass to the work of the theologians proper, whose standpoint differed from that of the philosophers in that they operated with the assumption—however diversely they might construe it—of a Christian revelation, and also in that they acknowledged an obligation to be serviceable to the life and labour of the Church. What first comes into view is their imposing work in the domain of Historical Theology, with its two main subdivisions of Biblical Science and Ecclesiastical History.

(*a*) The field of Biblical Science has been cultivated by German scholars with extraordinary assiduity. Every department of study has been enriched by their labours, and some of the important "disciplines" may be said to have been created by them. English scholarship independently devoted itself, with the most brilliant success, to the cultivation of two parts of the field—namely, the criticism of the text and the interpretation of the sacred writings in detailed commentaries. But whether it was that the Church in Britain had too severely limited the range of free inquiry, or that a conservative bias disposed to acquiescence in traditional views, it was left to the Lutheran Church to grapple with the fundamental literary problems, and to lead the discussion of the weightier issues. These problems and issues are specially bound up with the three great branches of modern Biblical Science known as Special Introduction or the Higher Criticism, Biblical History, and Biblical Theology.

The task of the Higher Criticism is to place in their historical setting the different books of the Bible, and to determine their date, authorship, destination and scope. The Church had inherited a traditional account of the age and authorship of the canonical books which the old Protestant theology accepted as on the whole reliable. Lutheran Scholarship undertook to re-examine the traditional views in the light of all available evidence, external and internal, and to test every other possible, and also every other impossible, hypothesis. In the domain of the Old Testament literature

the investigation was left almost entirely in their hands, except that at an advanced stage they were joined by Kuenen, Robertson Smith, Cheyne, Driver, and other collaborators. The outcome of the labour of well nigh a century is that a new view of the origin and sequence of the Old Testament literature has been elaborated which, subject to some differences in detail, has become the working theory of the great body of scholars throughout the world. The critical examination of the genesis of the New Testament literature had begun earlier, and provoked even greater turmoil and more embittered conflict. The epoch-making event was the promulgation by F. C. Baur of the famous Tübingen theory, which was founded on the idea that Christianity, after receiving its original impulse from Jesus, passed through a period of internal dissension, and finally reached a basis of compromise and reconciliation in the arrangements of the old Catholic Church. The New Testament was supposed to be a collection of writings extending over a century, which represented the different stages in the quarrel between Jewish and Gentile Christianity, and also the advances gradually made from each side towards a settlement. The theory is no longer maintained in its entirety by any body of scholarly opinion. Its abandonment was partly due to the learned and sensible criticism of a group of English scholars, but it was also contributed to by the labours of those who had called Baur master, and the event counts as evidence that in the long-run the theorising German mind makes acknowledgment of the pressure of facts. In the field of New Testament criticism a strong conservative reaction has taken place, and only isolated positions of the Tübingen School are still defended—such as the denial of the Johannine authorship of the Fourth Gospel, and of the authenticity of certain minor Epistles. It would, however, be extremely foolish to sum up the story as unnecessary labour which has nothing more to show for its reward than the triumph of good sense over gratuitous and unsubstantial German hypotheses. The scholar's know-

ledge of the New Testament, as the result of the investigations, is vastly deeper and richer than it was at the beginning of the controversies. There are also positive results of great interest and value. The extremely intricate Synoptic problem, for example, which has to do with the origin of the first three Gospels, has been almost solved by the infinite patience and ingenuity which have been brought to bear, and scholarship has come within sight of an agreement as to the sources from which they drew, the order of their composition, and the nature of their interdependence.

While Biblical Criticism has its independent interest, it is chiefly important as a preliminary to the work of the historian. For the great monographs of Biblical History the Church has mainly been indebted to the Lutheran Church. Ewald's *History of Israel*, though written from a critical standpoint which is now regarded as obsolete, still towers above the field in massive grandeur. How the history unfolds on the basis of the later types of critical view may be learned from the pages of Wellhausen, Stade, and Kittel. Passing to New Testament history, we find the outstanding fact to be the extraordinary amount of labour which was devoted during more than a century to the examination of the records of the life of Christ. At this point, more than at any other, it has been difficult to arrive at a satisfactory understanding as between the demands of science and the rights of faith. To English theology it long seemed that the only task left over to the Church by the Evangelists was to construct a harmony of the Gospel narratives, and to add to this devotional and practical applications such as make up the staple of Jeremy Taylor's *Life of our Lord*. In Germany the Life of Christ has been written under the influence of every variety of a Christian or philosophical creed. The pantheistic standpoint was occupied by Strauss, who made the assumption that miracles are impossible, and went on to explain the miraculous narratives of the Gospels as mythical growths. The theist who is sceptical about nature-miracles, but willing to believe in spiritual marvels,

including miracles of healing, finds the materials worked over in this interest with immense erudition and graphic power in Keim's *Jesus of Nazara*. The task was carried out in the fullest sympathy with the positive Lutheran creed by Neander, and more recently by Bernhard Weiss, whose *Life of Jesus* combines a supernatural faith with an unrivalled knowledge of the Sy optic problem, and utilises the critical results in the treatment of the details of the Gospel story. Notwithstanding the astounding labour and ingenuity that were brought to bear in a century of work on the literary materials, recent writers, like J. Weiss, have found it possible to propound some novel theses.[1] It may be felt that much of this labour upon the great theme had better have been left unattempted, and that hands have been laid upon the holy person of Jesus which were not fit to touch the hem of His garment. On the other hand, it is evident that the untiring research and speculation form an extraordinary tribute to the unique greatness and the invincible spell of Christ, and also that faith in the historical Christ is a thing of greater value when its grounds have been mercilessly tested, and it has emerged with a good conscience from the ordeal. It may be added that the German work on St. Paul and the Apostolic Age has not been marked by the same distinction, or achieved the same celebrity, as the attempts to re-edit the matter of the Gospels.

Biblical Theology is, perhaps, the most valuable of the Lutheran gifts to the wider Church. It was founded on the reasonable idea that it is desirable for the interpreter of Scripture to put aside all doctrinal bias, and to expound the teaching in sole reliance upon the ordinary linguistic and historical methods. It also seemed wise not to treat the Bible as if it were all of a piece—as had been done by the dogmatic theologians—but to regard it as the record of a progressive series of religious and ethical ideas, and to make a separate study of the contents of particular books

[1] Schweitzer, *Quest of the Historical Jesus.*

or groups of books. The theology of the Old Testament has been exhaustively set forth in monographs which are governed by the different phases of opinion about the literary sources—the traditional critical views being assumed by Oehler, while those of the now dominant critical school are presupposed in the valuable treatise of H. Schultz. The different types of New Testament Theology have been handled with even greater thoroughness. Weiss is probably the most successful in maintaining the ideal of impartiality and exhaustiveness in his *Biblical Theology of the New Testament*. The abler and more trenchant volumes of Holtzmann are injuriously affected by his negative bias, while Beyschlag's attractive *New Testament Theology* exaggerates the contrast between the Biblical teaching and the later standards of ecclesiastical orthodoxy. Mention should also be made of certain outstanding studies of individual types of New Testament doctrine—notably Wendt's *Teaching of Jesus* and Pfleiderer's *Paulinism*.

(*b*) In ecclesiastical history the German contributions have been marked by the same laboriousness and massiveness, and also by the same profession of freedom from dogmatic prejudice. Although there are various histories of the Church which cover the whole ground, no historian has brought to the task the comprehensive grasp, the dramatic instinct, and the narrative and descriptive power which, in addition to industry and convictions, are needed for doing justice to the story which is so strangely compounded of magnificent triumph and pathetic failure. The History of Doctrine, to name only one of the departments, has been enriched by masterly and brilliant monographs from Baur and Harnack. It is another question whether it is as easy to compass impartial historical treatment in this field as to make the profession of it. If the great Anglicans carried an apologetic bias into the field of Patristic Theology, and were unable to recognise palpable heresy in the writings of an ante-Nicene Father, Harnack is hardly less obsessed by the idea that the Hellenic mind had too little in common

with the German mind to appreciate the Gospel, and that the Greek fathers, by reason of their limitations, largely corrupted the Gospel into an inferior Metaphysic.

3. Remarkable as has been the work of the German mind in the historical fields of Theology, it has made another theological contribution which is even more distinctive. Alongside of the untiring research, there proceeded attempts to find a new basis for doctrine, and to re-edit more or less drastically the doctrinal material transmitted in the Creeds and Confessions. To this doctrinal activity there is no parallel in the work of the other great Churches. From the Roman Catholic standpoint, the question of the revision and statement of doctrine cannot arise, nor does such a task fall within the purview of Anglo-Catholic Theology. The so-called Broad Church School, as known in England and Scotland, on the whole thought it sufficient to ignore uncongenial aspects of the traditional theology, or to suggest modifications of isolated tenets; and it never grappled fully with fundamental principles, or faced the task of applying them in a revised and complete scheme of Christian doctrine. The theological mind of Germany had a passion for first principles and a talent for systematic completeness; and it produced a striking series of systems which rest on varying conceptions of the source of Christian doctrine and of the essence of Christianity. We can only touch here on this dogmatic contribution and must refer without discussion to the profound and elaborate treatment of Christian Ethics—the second main division of Systematic Theology—by a great succession which includes the names of Rothe, Dorner, and Herrmann.

The most original doctrinal contribution was made by Schleiermacher. At the close of the eighteenth century, it seemed to him that theology had fallen on evil days. It could not be built up out of the decisions of the Infallible Church, as this authority was discredited. Nor could reliance any longer be placed, after the old Protestant fashion, on the Infallible

Book. The rationalistic way, moreover, of falling back on common sense for a few simple ideas about God and duty seemed to him to sin against piety by depriving it of the Christ who had been the perennial spring of the life and power of the Church. His new proposal was to extract a scientific theology from Christian experience. Science asks two questions—what a thing is and does, and how it came to be; and it seemed to him that theology had the necessary scientific data in the experiences and convictions of the Christian society, and also a feasible scientific task in attempting to trace these spiritual facts to their causes. The result was a theological system, which, while it failed to do full justice to the Christian conceptions of God and sin, at least worked back to Christ as the ultimate source of the Christian experiences, and reinstated Him at the centre of Christian thinking. In recent times much relevant material has been collected in the field of religious psychology, and there has also been some talk among us of utilising it for progress in doctrine, but so far nothing constructive has emerged on these lines that remotely compares with the great systematic achievement which Schleiermacher handed on in *Der Christliche Glaube*.

A second theological school fell back on reason—not meaning by it the common sense of the Deists, but reason as it had taken body in modern German philosophy. The Hegelian philosophy, in particular, was welcomed as initiating the theologian into the deeper understanding of the Christian religion. Differences of opinion developed as to how much of the traditional doctrine of the Church was to be treated as kernel, how much as husk, but on the whole the more negative view prevailed, and found its exponents in Pfleiderer and Biedermann. There is no book in German which expounds the doctrines of a Christian Hegelianism with the lucidity and persuasiveness of Caird's *Fundamental Ideas of Christianity;* but even this noble treatise, with its sounder content, seems slight in comparison with the comprehensive and systematic *Christliche Dogmatik* in which Bieder-

mann sought according to his light to separate the temporary elements from the abiding substance of Christian doctrine.

During the last quarter of the bygone century the dominant school of Dogmatic Theology was that which took its name from Ritschl, and whose traditions have been carried on with general fidelity by Herrmann and Harnack. Ritschl agreed with Schleiermacher to the extent of holding that the authentic doctrines of Christianity are at least corroborated in experience, but he gave his system more strength and stability than had resulted from the purely subjective method by emphasising the uniqueness of the revelation of God which was given in and through the Christ of history. He also agreed with the earlier thinker in proposing to exclude metaphysics from theology. More recently a school has arisen which calls itself historical (Religionsgeschichtliche Schule). Its general idea is that there is a constant element of religious sentiment and attitude, if not of ideas, which gives a unity to all chapters of genuine religious history, and that in the religious spirit theology may find some materials which can be worked up as doctrine. Under this impulse German scholars are beginning to occupy themselves with the field of Comparative Religion, which they had previously neglected on the principle that theology has no subject-matter save the Christian religion. Whether anything worth calling a theology will be achieved by this latest school remains to be seen.

From the point of view of orthodox thought, whether Roman Catholic, Anglican, or Presbyterian, it is tempting to dismiss these doctrinal developments as mere examples of wasted ingenuity and presumptuous error. They would be in place, it is held, if the Church had the nature and function of an experimental station, but they are out of place in an institution which knows itself to be a sanctuary and a citadel. In literature and the arts fresh departments and novel creations are welcome, but in religion it is conceived that originality can only be spurious and dangerous. This feeling, it should be said, has been widely shared in the

Lutheran Church, which has given no reason for a sweeping identification of its thought with faithless and restless doctrinal innovation. At more than one stage of last century the confessional school of Lutheranism, which may be described as evangelical and moderately High Church, developed great intellectual activity and exercised, for a time, a powerful and widespread influence. It produced dogmatic treatises of orthodox doctrine—such as those of Philippi and Frank—in which the doctrinal materials were handled with the same scientific thoroughness and competency that mark the works of the greatest of the eclectic and radical masters. But apart from this compensation, it is well arguable that in the intellectual conditions of the present time, there was ample room for new constructions which proceeded on the footing that Christian truth is supremely credible and important, while yet its essentials are in need of being restated and readapted to the understanding and appreciation of modern minds. In our modern world men are no longer shut up to the alternatives of orthodox Christianity or Christian heresy: if they lapse from orthodoxy, there is the other likely enough alternative of travelling far from the Christian habitation into the realms of materialism or agnosticism. It may, therefore, well be thought to have been no small service to elaborate a variety of schemes of doctrine, which, even if they represented a defective and mutilated Christianity, at least maintained the Christian outlook upon the universe and destiny, and conserved simple elements of the Christian Gospel; and all the more may this view be deemed justified when it is remembered that a meagre faith honestly held and lived tends to increase in strength and range, and that, in the realm of truth also, he who is faithful over a few things may look to be set over many things.

II. THE LATTER-DAY CHURCH

It remains to touch briefly upon the life and work of the German Church in its Lutheran form. The ecclesiastical

institution in this case seems less impressive to an outsider than its theological activities—thus reversing the usual proportion and perspective—but the Lutheran Church still remains one of the greatest of the organised Christian societies, and it has a creditable record as a school of piety and character and as an instrument of Christian service.

There has been in Germany, since the age of the Reformation, a large and staunch Roman Catholic minority. In Bavaria it includes two-thirds, in Prussia about one-third, of the population, while for the Empire as a whole it is considerably over one-third. The vitality and tenacity of German Catholicism are evidenced by the concourse in its churches, and the vogue of its pilgrimages, and still more by its ability to organise a political party which puts ecclesiastical interests first, and has sometimes been strong enough to hold the balance of political power. Its official organ had the courage, while the political unity was still an experiment, to describe the German Empire as a passing thunder-cloud. It emerged with prestige from the *Kulturkampf* of the seventies, in which Bismarck vainly attempted to restrict the Catholic ideal of spiritual freedom in the interests of the national ideal. The Vatican Council, with its decree of Papal Infallibility, seemed to threaten a second German schism, but the opposition failed to develop any great volume or energy. Nor has Modernism evoked the response which might have been expected from the wide outlook and the liberal instincts of the German mind. The Roman Catholic Church in Germany, it may be added, has taken the social problem on its conscience, and has shown itself fruitful of ideas in the field of social service.[1]

The Protestant Church in its main body is Lutheran. In every kingdom and principality the Church is established and endowed according as the tradition is Protestant or Catholic, and there is also some measure of concurrent endowment. The Established Church of Prussia was consolidated in the course of last century by the union of

[1] Rae, *Contemporary Socialism*, Ch. VII.

the Lutheran and Reformed sections of the community. The relation to the State is distinctly Erastian, the Church being subject to control in doctrine and worship by a department of State, and in some cases by the municipal authority. The arrangement is vicious in principle, and if it has been generally acquiesced in it is probably from a suspicion that if the Church had had fuller autonomy its scholars and thinkers would have been allowed less individual liberty. The ecclesiastical constitution of the Lutheran Church varies in detail, but may be roughly described as a modified Presbyterianism which finds room for the superintendent, and can even, as in Sweden, utilise the historic Episcopate.

The membership of the Lutheran Church includes three well-marked classes. There is a body of devout and earnest people—conservative in doctrine, mystical in sympathy, strict in life, guarding the pious customs of family-religion, and sensitive to the missionary obligation of the Church. While on the whole loyal to the national church, this group feels the need of additional inspiration and more positive teaching, and has overflowed into associations and gatherings which breathe the spirit of Pietism or Methodism. The peasantry form a considerable part of the "churchly-minded" population, and their religion is of the type for which the Scottish Church formerly coined the name of Moderates. A third division calls itself modern, and positive in varying degrees, and it finds itself able to combine the new light from science philosophy or criticism with the substance of the inherited Christian faith.

On the other hand, the Lutheran Church has not the abounding life and vigour, nor does it possess the hold on the people at large, which might be inferred from the many millions reporting themselves "evangelical" in the census returns. Habitual church-going is uncommon. Many who consider themselves good churchmen explain that they do not feel the need of it, and sometimes add that Protestant preachers do not offer as convincing reasons for church-

attendance as those which are urged upon Roman Catholics. Attendance at Communion has also been markedly on the decline. A recent report mentions as a typical instance that in a suburb in which the population doubled in sixteen years the number of persons communicating fell from 22 to 10 per cent. in the same period.

The alienation of the masses from the Church is admitted to have almost reached, in certain districts and social strata, the dimensions of a popular apostacy. The breach began, according to a careful and well-informed writer, in the attempt of the Government during a revolutionary period to exploit the influence of the Church in the interests of political reaction. "Since then a great body of our people has become and continues to be at least indifferent to the Church. More than this, it has brought religion itself into discredit. All that comes from the Church and the clergyman, no matter of what confession or school, is still to-day largely exposed to mistrust and far-reaching prejudices."[1] Other causes have powerfully co-operated. The leaders of the Social Democratic party have commonly combined their criticism of the existing social order with a bitter attack on Christianity. "The great body of the popular orators of Socialism follow their lead in a diversified chorus. Everything must be dragged down into the dust —Fatherland, Church, and faith—while the multitude applauds and often cannot contain itself for delight at the vulgar mockery of sacred things."[1] In addition, a vigorous and sustained propaganda was independently made on behalf of naturalistic doctrines in the period from Büchner to Haeckel, and though there are some symptoms of the spell being broken, Braasch declares it to be certain "that the missionary efforts of materialism have wrought great havoc in wide circles, and overlaid the inner life with a mildew of doubts which it is hard to remove." The failure of the Lutheran Church to hold the people, which is thus indicated, is, of course, partly due to the attractiveness of

[1] Braasch, *Religiöse Strömungen der Gegenwart.*

a material gospel, and the plausibility of a creed which makes no demands on the unseen. But it may also be attributed in part to a want of energy on the part of the Church, which has never developed much pastoral effort, and which, though it strongly emphasizes one aspect of the priesthood of the laity, has had little success in creating the impression that membership implies an obligation of service, and in thus making the particular congregation to become a busy centre of Christ-like activities.

But while the congregational life of the Lutheran Church may seem languishing and poor when judged by foreign standards, it would be altogether unjust to speak of the institution as barren in good works. The spiritual quickening of the nineteenth century engendered a zeal and energy for Christian service which found expression in the support of Foreign Missions, and especially in the creation of manifold agencies for coping with the spiritual and material distress of the homeland. The contribution of Germany to the Foreign Mission Enterprise of Protestant Christianity is noteworthy in respect both of the admirable training which is provided for its agents, and of the efficiency and economy with which its operations are conducted in the foreign fields. More notable still has been the development of what is called the "interior mission." The work of the "Innere Mission" was not organised directly by the Church, but was entrusted to voluntary societies which were supported by the Church's liberality, and which placed at its service trained social workers of every kind. The great names of the movement are Wichern, Fliedner, and Bodelschwingh. The machinery includes institutes for the training of teachers and deaconesses, orphanages, reformatories, clubs for young men and women, labour homes and labour colonies. There are also special schemes for dealing with the widespread evils of drunkenness and immorality. All in all it forms a wise and noble continuation of the work of the Good Samaritan. The Christian spirit, it should be added, has also worked effectually through the machinery of the State. The

paternal legislation of Imperial Germany which made a universal provision against accidents and old age was launched under the name of Practical Christianity, and with the promise that it would be followed by other measures of social reform conceived in the spirit of Christ. "I frankly confess," said Bismarck, in a speech delivered in the Reichstag in 1882, "that my faith in the ethical maxims of our revealed religion is decisive for me in this question and also decisive of the attitude of my imperial master. I, the minister of this State, am a Christian, and I am resolved to act as such, and as I can justify my action before God."

We have thus passed in review the main features of the spiritual achievement of modern Germany. The century of the Reformation will remain the classic age of German religion, alike because of its stronger faith and of the impressive definiteness of its religious thinking; but the Germany of the nineteenth century, replenished as it was with fresh spiritual experiences, and endowed with a passion for truth and the most extraordinary intellectual thoroughness, for the second time was able to establish a title to religious fame. The creative spirit which bloweth as it listeth to quicken the life of humanity gave to the peoples of the west during the last century an unusual capacity for zeal and devotion in noble causes, and also an unwonted number of men of genius and of first-rate talent; and Germany, receiving its full share of this benefaction, dedicated at least a tithe of it to the business of religious thought and service. But if the recent German period is to be reckoned one of the outstanding periods in the history of religion, the further question is raised in the light of past experience as to how far it may have run its course. There is a principle of economy which governs the operations of the quickening spirit, so that while it may lavishly furnish the inspiration and the power that are needed for a new beginning, it does not undertake to promote continuous progress, or even to ensure the maintenance of the highest

level that has been reached. In science advance may be fairly steady, and ground that has been won may be easily kept, but it is different in the æsthetic sphere, and still more in the realms which belong to the moral and spiritual life of man. In these regions every fresh outburst of life and thought tends to traverse the stages of growth, perfection, and decay—though the season of decay doubtless has compensation in the gathering of fruit, and in the enrichment of the soil with fallen leaves against another spring. And the evidence has been accumulating that the movement of the German spirit which made its distinctive contribution to the greatness of the nineteenth century, has entered upon a phase of declension if not of decadence.

The new religious period began in the deepening and quickening of the spiritual life of the people, but in the course of the century its soul developed a markedly different temper. The consolidation of the German Empire tended to replace religion by patriotism, and the extraordinary economic development that ensued fostered a materialistic spirit which to some extent overwhelmed the mystical and idealistic elements of the spiritual patrimony. Reference has already been made to the inroads made upon the Christian faith and conscience by the anti-religious propaganda. One of the strongest and noblest souls, writing at the close of the century, summed up with a heavy heart on the contrast between the early promise and the later fulfilment. "The spring is without doubt over and gone. The sun which we saw rise is dropping in the west. The fields once richly irrigated, in which a noble seed sprouted forth, have gradually become more parched and withered. There have been fruits, noble and fair, but not what we looked for from the promise of the blossom." [1]

Parallel with this decay of religious life there has been a downward trend in the intellectual activities which may be comprehensively conceived as spiritual genius. There is, indeed, ground for saying that this declension was a general

[1] Frank, *Neuere Theologie*, p. 266.

European phenomenon—that men of the largest mould became fewer, and that we had to be content with cleverness in place of genius, while mankind at large became more conscious of its interests than of its privileges and duties. But in any case Germany perhaps most clearly exemplifies the waning power of the spirit. By all analogy the mighty deeds of modern Germany, coincident as they were with the opening up by science of the most thrilling vistas of time and space, should have inspired another great literary age, but although forty years have elapsed since it received the new inspiration, Germany has scarcely produced in the period a poet or a novelist whose name is even known by hearsay in other lands. In the Arts it would also appear that the inspiration has failed. Passing to Philosophy, which, in Germany, has always kept in close touch with religion, the descending scale has been very marked in respect both of spirit and achievement. It was a long descent from the moral rigour of Kant, and from the majestic sweep of Hegel's speculative philosophy, to the pessimism and cynicism of Schopenhauer, and still further to the level at which Haeckel was hailed as a philosopher and Nietzsche as a prophet. In the realm of Theology the Ritschlian School, the latest of capital importance, may be held in real respect and yet be judged to have been the most pedestrian of the succession which began with Schleiermacher. In the historical branches of theology research proceeds with unabated industry, and there has been a growth in pointedness, and also a marked improvement in literary style, but the library of the monumental books has scarcely been added to for two decades, the figures of Wellhausen and Harnack that rank with the giants of the past belong to the older generation, and on the whole the men and the work of the period may be said to exhibit the characteristics which the Germans are wont to describe in other connections as those of the Epigoni, the posterity and the foil of the heroes.

The religious development of Germany in the immediate future will be watched with intense interest. There

are many circumstances which seem to point towards a climax of religious apostacy—especially the aggressiveness of anti-Christian modes of thought and secular ideals, and the evidence of lessening power of resistance from the Christian side. The present war also contains the conditions of a popular religious crisis. For the Kaiser, with the support at least of the aristocracy and the officials, has appealed to the Almighty as the trusted protector of a chosen people; and if the issue should prove to be an overwhelming disaster the religious consequence may well be that, like Israel of old when the God of history disappointed its hopes, it will be disposed to seek for another and a mightier divinity. More probably the result would be a return to the position of the old-world northmen for whom Gauka Thor spoke when he confessed that "he and his comrade were neither Christians nor heathens, but trusted to their own courage, strength, and fortune, with which until then they had had every reason to be satisfied." [1] On the other hand, in the religious sphere the operative laws deal out much of the unexpected and the paradoxical. For a nation the religious consequences, whether of prosperity or of adversity, are on the whole incalculable. It is a weighty consideration that history shows the German people to be susceptible of a deep stirring of its spiritual life by the mysterious influences which surge up out of the depths, and the quite probable recurrence of such an experience would again, as in the past, sweep away the negations of the irreligious interval, and furnish the materials of a new if simplified Christian creed. But again, this historical probability might be crossed by the law of which our Lord made mention when He spoke of "the day of visitation" that may not return. "Our Lord God," said Luther in his table-talk, "deals with countries and cities as I do with an old hedge-stake when it displeases me: I pluck it up and burn it and stick another in its stead." To the same effect he elsewhere warned his

[1] Pigott, *Scandinavian Mythology*, p. 26.

people to buy while the market was open, to gather in while the weather was fine, to use the grace and the word of God while it was with them. "For this ye must know, my beloved Germans, that the word and grace of God is a shower of rain which drives across a district, but does not come back to where it was. Once it was with the Jews, but it is gone, and now they have nothing. Paul brought it to Greece: it is gone, and now they have the Turk over them. Rome and the Latin land also had it: it is gone, and now they have the Pope. And you Germans may not think that you will have it always, for unthankfulness and contempt will not suffer it to abide with you. Wherefore let him who can, grip it and hold it fast; for idle hands there will come an evil time." [1] "If you perish," said Fichte, thinking of the same menace of spiritual decay and death, "the whole of humanity perishes with you, and without hope of a future resurrection." [2] The law of the irrecoverable opportunity, however, we may well hope, is less inexorable than Luther thought; and the fears of Fichte as to the wider consequences seem to be overpitched even if, in the history of the world which a German has called the judgment of the world, the candlestick of Germany should for a season be removed out of its place.

[1] *An die Bürgermeister und Rathsherren allerlei Städte in deutschen Landen.*

[2] *Reden an die deutsche Nation.*

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